2012

University of North Carolina Wilmington

Master of Science in

Computer Science and Information Systems

Proceedings

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Developing an IT Strategy for New Hanover Community Health Center

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Abstract

In recent years Information Technology (IT) has become a critical tool for execution of business objectives and for a business having an IT strategy is critical to a successful enterprise. The core intent in developing an IT strategy is to ensure that there is a strong and clear relationship between IT investment decisions and the organization's overall goals, and objectives. This summary provides a synopsis of the IT strategy developed for this capstone project. The intent is to provide a quick guide for senior management relative to the Center's IT needs. The recommendations are provided in descending priority.

Recommended Citation: Ihenacho, N., Ricanek, K., Reinicke, B., Gebauer, J. (2012) Developing an IT Strategy for New Hanover Community Health Center. *Annals of the Master of Science in Computer Science and Information Systems*, 7(2) Paper 3. http://www.csb.uncw.edu/mscsis/annals/.

DEVELOPING AN IT STRATEGY FOR
NEW HANOVER COMMUNITY HEALTH CENTER

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A Capstone Project Final Report Submitted to the
University of North Carolina Wilmington in Partial Fulfillment
of the Requirements for the Degree of
Master of Science

Department of Computer Science
Department of Information Systems and Operations Management

University of North Carolina Wilmington

July 19, 2012

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Chapter 1: Introduction

In recent years Information Technology (IT) has become a critical tool for execution of business objectives and for a business having an IT Strategy is critical to a successful enterprise. IT strategy is a long term planning process for an organization's IT department to utilize IT for the organization's long term success. The core intent in developing an IT strategy is to ensure that there is a strong and clear relationship between IT investment decisions and the organization's overall goals, and objectives.

1.1 Overview of New Hanover Community Health Center

The New Hanover Community Health Center (NHCHC) is a private, non-profit organization dedicated to providing families with quality primary health care. New Hanover Community Health Center receives federal grant funds awarded by the United States Department of Health and Human Services (DHHS), Health Resources and Services Administration (HRSA) pursuant to Section 330 of the U. S. Public Health Service Act (Section 330), 42 U.S.C. ' 254b, to provide a full spectrum of primary and preventative health care services (including essential ancillary and enabling services) to medically underserved populations, in New Hanover and surrounding counties in Southeastern North Carolina. Patients receive services regardless of the individuals' or families' ability to pay.

New Hanover Community Health Center is not a free clinic. Its target population are individuals and families at or below 200% of the federal poverty level. Charges for this population are based on a sliding fee scale that takes into consideration the number of persons in the family and their total income.

New Hanover Community Health Center accepts almost all insurances, Medicaid and Medicare and takes care of all ensuing paperwork.

Some Services provided by New Hanover Community Health Center include:

1. Parental and new born care
2. Immunizations
3. Adolescent Health Care
4. Gynecology
5. Women's Health
6. Sports Physicals
7. Family Planning and Contraception
8. On-site dental care
9. Sick and well child care
10. Nutrition counseling
11. Adult medicine
12. Geriatric care
13. Minor Injuries
14. Chronic and Acute illnesses
15. Minor surgical procedures
16. Specialty service referrals
17. On-site pharmacy and laboratory
18. 24-Hour medical emergency hotline

The Health Center is regarded as non-profit and so, not many resources have been allocated the IT department. Most of the hardware is old and legacy, outdated methods and no future IT

implementation strategies exist. All these events and having to fight daily fires as the sole on-ground IT personnel inspired the need for this project. The need to invest heavily in IT is becoming clearer by the day and this project will be the foundation for any such movement going forward as it will provide the direction needed to make the proper investments necessary so that NHCHC can improve their service to their end-customer and reduce the cost of providing those services from an IT perspective.

In coming chapters I will be reviewing the current state of IT at NHCHC in great detail. I will be exploring the various IT needs and the Y-Model which will be methodology used in developing an IT strategy for NHCHC. I will also at the end list the deliverables for this project.

Chapter 2: Review of Literature Review and Analysis

2.1 Current State of IT at New Hanover Community Health Center

2.1.1 Hardware:

NHCHC plays host to several hardware components to help run the business on a daily basis. A summary of hardware at NHCHC is listed below;

i. 40 Dell Optiplex workstations.

ii. 5 Toshiba Notebooks.

iii. 2 HP Pavilion laptops.

iv. 6 Asus Eee notebooks.

v. 7 servers.

vi. A fax finder machine.

vii. 36 printers including Multi-function printers, fax clients, scanners etc.

viii. 2 Motorola wireless switches.

ix. 8 Motorola wireless access points.

x. 15 Coby speakers.

xi. 4 3Com Network switches.

xii. 1 3Com NBX Gateway Chasis.

xiii. 2 Buffalo high Performance shared network storage.

xiv. 1 APC UPS.

See Appendix B for a detailed inventory of all New Hanover Community Health Center hardware system and their locations within the Health Center.

2.1.2 List of software systems used at NHCHC:

- Sage Intergy
- Health Pro-XL (old system in use before Sage Intergy)
- Sage EHR
- Sage Practice Analytics
- Sage Intergy Practice Portal
- Phone Tree
- MIP Accounting
- Media Dent
- MARP (Medication Access and Review Program)

2.1.2.1 Sage Intergy:

Sage Intergy is an electronic health records (EHR) and practice management solution used at NHCHC. Sage Intergy is a complete suite, including electronic health records, practice management and patient portal. The system is designed to help practices transform into meaningful users of healthcare technology, to improve clinical workflow and drive quality improvement; engage patients; measure and optimize clinical and financial outcomes. Sage Intergy is certified by the Office of the National Coordinator – Authorized Testing and Certification Body (ONC-ATCB).

Key features:

i. Comprehensive patient charting
ii. Online patient engagement
iii. Integrated e-prescribing and Computerized Provider Order Entry (CPOE)
iv. Dashboards for tracking and reporting meaningful use

v. Server-based or hosted, subscription option.

vi. Single database with Intergy practice management.

vii. Full integration with Sage Medical Manager, Sage MENDS, Sage Health Network and Sage MedWare.

viii. Support HL7 standards for interoperability with third-party vendors.

2.1.2.2 Sage Intergy EHR

Sage Intergy EHR is part of the Sage Intergy suite. This is another Sage solution designed to adapt to health center's current workflow and improve overall practice efficiency.

Key features:

i. Customizable Encounter Note templates, forms and favorites for easy and complete documentation.

ii. Preventive health and disease management tools to help you deliver quality care every time.

iii. Integrated lab orders/results and e-prescribing to reduce paper, faxing and phone calls.

iv. Standards-based interoperability with Health Information Exchange.

2.1.2.3 Sage Practice Analytics:

Sage Practice Analytics is a business intelligence tool that facilitates integrated clinical reporting and data analysis.

Key features:

i. Graphical and intuitive financial dashboards for at-a-glance view of practice performance
ii. Meaningful use dashboards, for tracking and reporting performance against functional and clinical CMS requirements
iii. Ad-hoc report writing for more complex reporting across multiple dimensions of clinical, financial and administrative data

System highlights:

i. Scalable to your practice with desktop and server-based options
ii. On premise server or subscription-based, hosted option
iii. Ability to process high volume data queries without impacting practice management and EHR system performance

2.1.2.4 Sage Intergy Practice Portal

Sage Intergy Practice Portal is a secure online system that enables NHCHC as practice to provide an online “face” to its patients, creating an avenue of improved communication between patients and the Health center. Sage Intergy Practice Portal is fully integrated with the Sage Intergy suite of solutions.

Key features:

i. Online patient services, including Rx renewal and appointment requests, bill payment, pre-visit clinical questionnaires, and more
ii. Patient access to test results and online clinical summaries

iii. Secure messaging for safe patient-practice communication

System highlights:

i. System security using secure messaging, password protection and data encryption
ii. Fully hosted solution, requiring no maintenance or data back-up by your practice
iii. Full workflow integration with Sage Intergy, reducing manual labor and data entry

2.1.2.5 Phone Tree:

PhoneTree is an automated messaging solution used by NHCHC. Using data from the Sage Intergy suite, PhoneTree creates and delivers a specific message for each patient, with the time and date of appointment, provider's name, appointment type and more.

2.1.2.6 Sage MIP Accounting

Sage MIP Accounting is an integrated financial management solution that helps the Health Center stay within budget; more effectively manage grants, and demonstrate greater accountability and stewardship. It also helps the Health Center stay in compliance with Financial Accounting Standard Board (FASB), Government Accounting Standard Board (GASB), and other reporting requirements.

Some functions include;

Budgeting – Monitor and track budgets

i. Easily review budgeted amounts, dollars spent, committed funds, and available budget.

ii. Quickly produce comparative statements for management staff and board of directors illustrating the budget to actual position for programs, grants, departments, and other cost centers.

iii. Estimate future periods with ease and calculate forecasted financial positions, including analyzing "what-if" scenarios for better decision making.

Reporting

i. Quickly produce a variety of standard nonprofit financial management reports, including FASB-compliant financial statements.

ii. Easily report on multiple fiscal years, produce custom, multi-fiscal-year reports, or format custom reports to NHCHC specific requirements.

iii. Write dynamic financial statements directly in the application without programming knowledge.

iv. Set up an unlimited number of financial statements and save them for future use.

v. Streamline compilation of your annual federal form 990 with time-saving 990 worksheets.

Simplify Grant Management

i. Easily track grantor details, including contact information, reporting periods, indirect cost rates, notes, custom fields, and more.

ii. Conveniently monitor Health Center’s budget position to ensure the proper administration of funds and spending.

iii. Measure the effectiveness of the Health Center’s programs and demonstrate its financial responsibility respective grantors, volunteers, and others.

iv. Enjoy complete integration with other Sage Fund Accounting modules for maximum functionality.

Complete Software Integration: Wide range of fully integrated solutions designed to work seamlessly with Sage Fund Accounting Solution, including:

i. Sage Fundraising (donor management and development)
ii. Sage Abra Payroll (payroll processing)
iii. Sage FAS Nonprofit and Sage FAS Government (fixed asset tracking)

2.1.2.7 Medication Access and Review Program (MARP)

MARP Software is an application developed to ease the administrative burden in obtaining free medications. It's a free software program for establishing and maintaining a Prescription Assistance Program (PAP). MARP Software has a Database of 3400+ medications from 147 pharmaceutical manufacturers. The Database automates the process of searching for free or low cost medications determining patient eligibility completing applications, tracking requests and reorders. MARP maintains patient medication and medical history, generates prescription bottle labels and prescriptions, extensive pharmacological database for medication management. Patient information is available in English and Spanish.

Software Benefits

- Eliminates handwriting applications
- Checks for patient eligibility against pharmaceutical company criteria
- Checks for patient medication adverse events
- Applications and program notes are updated daily

- Tracks monetary value of medications requested and delivered

2.1.2.8 ProLingua:

ProLingua is a web based application that enables hospital staff to immediately speak over 7,000 common medical questions and directives in multiple languages. All that is required is simply click on the phrase that needs to conveyed, and ProLingua verbalizes that phrase in patient's primary language.

Some Benefits of ProLingua include

Greater operational efficiency: Language barriers create bottlenecks in Health Centre's workflow. ProLingua helps reduce these bottlenecks by providing instant access to language support; moving Limited English Proficient (LEP) patients more efficiently and effectively through each stage of the medical encounter.

Optimized use of interpreters: In-person interpretation is vital during medical encounters requiring complex dialog or the dissemination of sensitive information. ProLingua ensures interpreters will be more readily available to support these encounters by handling simple communications and administrative tasks directly.

Improved patient satisfaction: Patient anxiety increases when they don't understand what is happening to them. ProLingua reduces this anxiety by enabling clear, direct communications with LEP patients. Reducing anxiety leads to improved patient compliance and improvements in perceived quality of care.

Controlled cost structure: As LEP patient population grows, it creates a potential increase in demands on Health Centre's language services budget. With ProLingua NHCHC can extend its language support.

2.1.2.9 MediaDent for Community Health Centers:

NHCHC uses MediaDent as its Electronic Dental Record (EDR) solution. MediaDent CHC EDR offers complete digital radiography, scheduling, billing, clinical record, treatment planning, referral tracking, lab tracking, document scanning and much more. It can function as a stand-alone solution or fully integrated via HL7 with existing EHR software, in our case Sage Intergy EHR. When integrated with medical practice management and Sage EHR solution, MediaDent can utilize the patient demographics, sliding fee schedules, dental insurance information and appointment book details to automatically create a dental patient file in the EDR system to easily create the dental restorative and periodontal charts, clinical treatment notes and treatment plan. All of the information on patients seen and treatment performed will then automatically combine with the patient's medical information to simplify billing and UDS reporting [10].

2.1.3 External IT Relationships:

NHCHC employs the services of Windstream as its Internet Service Provider (ISP). NHCHC engages the services of an external IT consultant Earney Consulting. Earney Consulting is on a 4 – hour a month contract. They are called in extreme cases where higher expertise than local on the ground IT personnel is required. They also serve as back up for the Health Center in the absence of Health Center's sole IT Staff.

2.1.4 NHCHC Information Technology Needs:

After detailed study of all Information technology infrastructure, hardware, software and business flows within New Hanover Community Health Center the following have come to light

the Information Technology needs of the Community Health Center. The IT Strategy will focus on meeting these needs. These needs have been classified into Infrastructure needs, system needs and service needs.

2.1.4.1 Infrastructure Needs:

I. Network infrastructure: Currently NHCHC does not have a proper network infrastructure design. The current network infrastructure came to be as computers were thrown together because several years ago the need to have a network showed up but no thought was giving to planning and designing a good network infrastructure.

II. Improved and more efficient system for user support: Prior to my term as Computer System/Network Administrator at New Hanover Community Health Center there was no formal way of submitting complaints for the System Administrator's attention. The System Administrator had to be paged all over the building by anyone with an IT need. This was ineffective and unorganized. I created a form in portable digital format for managing these requests where users filed out their complaints and submitted IT Request form electronically. While this has drastically improved management of IT Requests, it could still use a lot of improvement or even complete replacement.

III. IT Maintenance schedule: Presently New Hanover Community Health Center IT shop has little or no IT maintenance schedule. Maintenance is done most of the time as needed. This is mainly due to limited availability of an IT Administrator. We have scheduled times for vacuuming various workstations and servers, we also have all users running their anti-virus on their individual workstations on a daily basis. There is definitely a

huge need for more preventive maintenance especially as it concerns hard disc cleanup for all workstations, optimizing fragmented files, checking hard drive for errors.

IV. Hardware purchase and replacement plan: New Hanover Community Health Center is registered as a non-profit organization and so most of its funding comes from government grants and donations and for this reason investment in Information technology is limited. The result is at the moment we have a lot of equipment that are past their useful life or very close to it. We have some technologies that are no longer supported by their manufacturer, even some whose manufacturers no longer exist. In my time as System Administrator new equipment has only been purchased as needed not as projected. This strategy should provide a technology purchase replacement plan for health center's various equipment. This plan will cover hardware technologies like servers, backup devices, routers/switches, user workstations, printers etc.

V. Server needs (space, physical security, administration): Our server management has not been the most efficient. New Hanover Community Health Center has six servers that manage various services. These servers are located in a server room with some servers on the server rack; others are located on the floor in the server room and dental server in the second IT Area which is also laying on the ground. Another issue with server management is physical security of the hardware, the server room is really accessible to all members of staff during the day even if they have no business in there. After work hours the main entrance into server still stays unlocked and though it is located within medical records area which is locked after hours, anyone (like the cleaners) who has access to medical after hours also has unrestricted access to our server. The dental server is also situated in a location that stays open most of the time. There is a need to shrink the

space required and used by these servers while still keeping all the services they provide separated. A solution for this will not create space but also reduce the amount of power consumed within the health center. there is also need for improved physical security for the hardware.

VI. Backup/Storage needs: Currently New Hanover Community Health Center uses the Buffalo High Performance share network storage drives for performing daily incremental backups and weekly full backups. This solution definitely works well for our present situation but in the event of a disaster affecting building or loss of equipment we may not be adequately prepared especially if the situation is sudden.

VII. Phone System: Presently 3Com is the service provider for NHCHC phone system. Several situations have become a regular occurrence with our phone system that make the service unbearable. We have had several situations where automatic answer for callers providing them options to dial to reach specific services doesn't work and calls are dropped automatically after they ring out. On a few occasions the phone system for no known reasons shuts off and no one can make or receive calls until a reboot is done. We've had to replace the hard drive for the phone system and yet this has not solved anything. The system is in my opinion at the end of its useful life.

VIII. User Workstations: Breakdown on user workstations is probably the biggest concern in New Hanover Community Health Center. The average age of the workstations in the Health Center is 3 years. We have had to replace a few because of the critical needs of the areas. This is one area where something needs to be done very urgently.

IX. Improved Wireless network efficiency: New Hanover Community Health has constantly experienced connectivity issues with wireless service within the Health center.

2.1.4.2 Systems Needs:

I. Sage vs MediaDent Communication breakdown (Improved software communication): MediaDent (software system used by dental department for patient administration) is originally designed interface with Sage Intergy to retrieve patient information from Sage Intergy and populate itself. This was to improve efficiency of patient management at dental as patients wouldn't have to be checked in twice before being seen by the dentist as patient information are readily available in MediaDent once patient registrars at front desk have filled in or updated patient information. This process however has not been consistent as on several occasions MediaDent fails to update patient schedules or certain patient information. This has become a major concern for the dental staff and urgency has to be given to fixing this situation.

II. MediaDent Updates Management Schedule: On a few occasions dental staffs have walked in to new updates with the dental application MediaDent. With no one informed or any preparations made updates were pushed> There is really a huge communication gap between New Hanover Community Health Center and MMD Systems (developers of MediaDent).

III. MediaDent Training for Dental Staff: MediaDent was deployed at New Hanover Community Health Center August 2011. Minimal training was provided existing staff as just one representative from MediaDent was present to train all of the dental staff. There has also been a lot of changes in the dental staff since deployment of MediaDent and so several users never got a formal training. On a daily basis questions on how to use certain

parts of the system arise and there is no ready answer. There are also limited training materials available online and this really inhibits efficiency.

IV. Customer feedback system: it is important for New Hanover Community Health Center to understand how patients see them. When patients have complaints it's much better they bring it to the Health Center than the general public. Presently patients do not have any opportunity or avenue to give except vocally to give feedback or bring concerns to the attention of Management or anyone within New Hanover Community Health Center. This has resulted in some patients giving negative reviews on Google and other avenues for issues that could have been discovered and taken care of within. This makes the need for a Patient feedback system more than crucial to the Health Center at this point.

V. Improved social media presence: Presently New Hanover Community Health Center is behind the sphere when it comes to taking advantage of the benefits of social networking. Last year in August a Facebook page was created to give the Health Center some social presence but this has been under-utilized and is almost now non-existent. According to statistics from socailbaker.com North Carolina has about 4.6 million Facebook users; ranking it tenth place in the country. This is just a slight indicator to how much potential social media marketing can push the increased numbers at New Hanover Community Health Center.

2.1.4.3 Service Needs

I. User Training needs: One of the main concerns with Information Technology faced on a regular basis at New Hanover Community Health Center is the users of IT. Problems ranging from not knowing how to describe an issue, seeking help for the most minute

issues, not understanding proprietary systems used at work and more have to confronted by the day. For an organization that depends a heavily on Information technology in almost every area of its operations, a plan to bring all staff to speed and keep them par with trends in information especially technologies used within the Health Center is long overdue. This will also help optimize time as there will less time spent on support.

II. Staffing needs: (Redefine job description for IT personnel) Presently New Hanover Community Health Center runs a one man IT Shop. The only IT staff the Computer System Administrator who works 20 hours a week and is supervised by the Deputy Director of the Community Health Center. The Computer system Administrator is responsible for supporting about 35 of the Community Health Center employees, managing the organization's network, working with all IT vendors, maintain Community Health Center website just to mention a few. There is definitely a need for investing in increasing number of IT staff at the Health Center.

III. Web site security: NHCHC Presently hosts its own website in house. This is accomplished using the Healthpro XL Server. This works well at the moment since NHCHC no longer uses Healthpro XL as its EMR solution, it was a good way to put the sever to use so it is not just occupying space in the Server room. the Healthpro XL server has a good amount of space and adequate enough processing power to adequately host the NHCHC website. However locally hosting the NHCHC website presents some issues with it. Issues with security of the website and making the entire network vulnerable in the event of a successful network breach. Another significant issue is with a new CEO NHCHC is looking to improve its web presence by redesigning website and hosting on a different web server than the IIS webserver we currently use. Needless to mention issue

cases of website becoming available in the event of any issues with server or disaster at NHCHC.

IV. IT User Policies: Presently there are no documented user IT policies. This means users cannot be held accountable for misuse of computers or any other IT equipment.

V. Email Management spam messages: Recently there has been a barrage of spam emails sent to various users within New Hanover Community Health Center. This has also provided access route for several malicious software and viruses into the network and individual workstations causing severe damage to certain workstations within the Health Center.

Chapter 3: Methodology

The objective of this project is to create an IT strategy for New Hanover Community Health Center. This idea came as a result of a need that was identified on October 20th 2011, with a meeting of Dr. Karl Ricanek and myself and the Senior Management of New Hanover Community Health Center. During this meeting, several IT requirements of NHCHC were identified. The primary need that arose from the meeting was the development of a comprehensive IT Strategic Plan.

For the purpose of creating an IT strategy for NHCHC, I will be adopting the Y-model. I have also tried to ensure that all recommendations made are in conformance with specifications of Information Technology Infrastructure Library (ITIL) framework.

3.1. The Y-Model:

In all kinds of strategy work, there are three steps; Analysis, selection and implementation. This is clearly demonstrated in the Y-model. The Y-model is a useful tool in making changes and developments at different levels in an organization. It describes the necessary steps in the developmental process and will help the organization see make clear the course of action needed to take to improve performance.

The model is named the Y-model simply because the steps in the developmental process are presented in the form of the letter Y (see figure below). The Y-model provides a systematic and planned approach that is easy to implement.

The Y model consists of three steps and seven stages in these steps. The first step is concerned with analysis. The second step is concerned with choice (selection and decision), while the final step is concerned with implementation. The 'Y' model provides a coherent systematic procedure

for development of an IT strategy. The description of the various steps and stages of the Y-model are as seen below

1. Current situation: In any developmental work it is fundamental to start with a description of the present situation. On an organizational level this requires a true and representative description of the organization as it is seen right now, including both organization's strengths and weaknesses. This description should provide an accurate and up to date picture of how the organization is working today - not how it used to be or how one would like it to be, but how it actually functions at present. Such a systematic description helps to clarify what one has to change. A good understanding of the present permits the organization to more easily describe the desired future and to define the changes necessary to move ahead to attain those goals. This initial phase is often referred to as "diagnosing" the situation. The current IT situation in the business can be described using several methods. The benefits method identifies benefits from use of IT in the business. Distinctions are made between rationalization benefits, control benefits, organizational benefits, and market benefits. Other methods include the three-era model, management activities, and stages of growth. Chapter 2 of this report is a detailed analysis or assessment of IT at NHCHC.
2. Desired situation: Once the present situation is well described next step will be to focus on the desired situation. This essentially describes goals or desired results. Having clearly defined goals makes it easier to define what actions need to be taken to reach those goals. The desired business situation can be described using several methods like Value configurations, competitive strategy, management strategy, business process

redesign, knowledge management, the Internet and electronic business, and information technology benefits.

3. Analyse and prioritize needs for change. After descriptions of the current situation and the desired situation, needs for change can be identified. The gap between desired and current situation is called needs for change. Analysis is to provide details on needs, what change is needed, and how changes can take place. What-analysis will create an understanding of vision and goals, knowledge strategy, market strategy, and corporate problems and opportunities. How-analysis will create an understanding of technology trends and applications. These analyses should result in proposals for new IT in the organization.
4. Seek for alternative actions. When needs for change have been identified and proposals for filling gaps have been developed, alternative actions for improving the current situation can be developed. New IT can be developed, acquired, and implemented in alternative ways. For example, an information system can be developed in-house by company staff, it can be purchased as a standard application from a vendor, or it can be leased from an application systems provider (ASP).
5. Select actions and make an action plan. When needs for change and alternative actions have been identified, several choices have to be made and documented in an action plan. Important issues here include development process, user involvement, time frame and financial budget for IT projects.
6. Implement plan and describe results. This is the stage of action. Technical equipment such as servers, PCs, printers and cables are installed. Operating systems are installed. Application packages, software programs, programming tools, end user tools, and

database systems are installed. Development projects are organized. Management and user training takes place. Document results over time.

7. Evaluate results. Implementation results are compared with needs for change. It is determined to what extent gaps between desired and current situation have been closed. This is the beginning of the IT strategy revision process, where a new process through the Y model takes place.

While stages 1 to 3 cover analysis, 4 and 5 cover choice, and 6 and 7 cover implementation. The last two steps however will not be part of final product for this project as this requires a commitment by the organization in this case NHCHC to attain the desired results.
Every step in the Y-model is absolutely necessary in order to achieve the desired results.

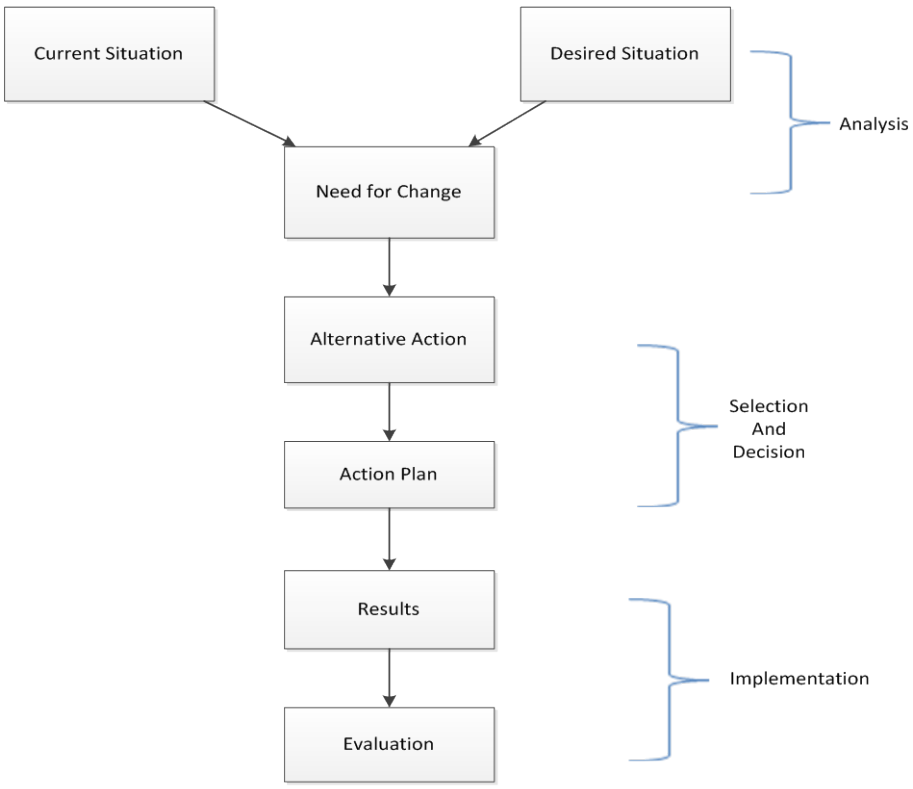


Figure 3.1

3.2. Information Technology Infrastructure Library Overview.

ITIL A set of Best Practice guidance for IT Service Management. ITIL is owned by the Office of Government Commerce (OGC) which is a department of the UK government and it consists of a series of publications giving guidance on the provision of Quality IT Services, and on the Processes and facilities needed to support them (Addy, 2007). ITIL is the most widely accepted approach to IT Service Management. ITIL focuses on the continual measurement and improvement of the quality of IT service delivered, from both a service provider and user perspective.

A service is a means of delivering value to customers by facilitating outcomes customers want to achieve without the ownership of specific costs and risks (ITSMF, 2007).

Service management: Service management means managing a service. In a nutshell, the service provider is encouraged to identify and agree what the customer needs and then provide it in a continuous and ongoing way.

ITIL has 5 key principles namely

- Service Strategy
- Service Design
- Service Transition
- Service Operation
- Continual Service Improvement

Service Strategy

The Service Strategy volume provides guidance on how to design, develop and implement Service Management, not only as an organizational capability but also as a strategic asset. Guidance is provided on the principles underpinning the practice of Service Management which are useful for developing Service Management policies, guidelines and processes across the ITIL Service Lifecycle. Service Strategy expands the scope of the ITIL Framework beyond the traditional audience of ITSM professionals.

Service Design

The Service Design volume provides guidance for the design and development of services and service management processes. It covers design principles and methods for converting strategic objectives into portfolios of services and service assets. The scope of Service Design is not

limited to new services. It includes the changes and improvements necessary to increase or maintain value to users over the lifecycle of services, the continuity of services, achievement of service levels and conformance to standards and regulations. It guides organizations on how to develop design capabilities for Service Management.

Service Transition

The Service Transition volume provides guidance for the development and improvement of capabilities for transitioning new and changed services into operations. This publication provides guidance on how the requirements of Service Strategy encoded in Service Design are effectively realized in Service Operations while controlling the risks of failure and disruption.

Service Operation

The Service Operation volume embodies practices in the management of Service Operations. It includes guidance on achieving effectiveness and efficiency in the delivery and support of services so as to ensure value for the user and the service provider. Strategic objectives are ultimately realized through Service Operations, therefore making it a critical capability. Guidance is provided on how to maintain stability in Service Operations, allowing for changes in design, scale, scope and service levels. Organizations are provided with detailed process guidelines, methods and tools for use in two major control perspectives: reactive and proactive. Managers and practitioners are provided with knowledge allowing them to make better decisions in areas such as managing the availability of services, controlling demand, optimizing capacity utilization, scheduling of operations and fixing problems. Guidance is provided on supporting

operations through new models and architectures such as shared services, utility computing, web services and mobile commerce.

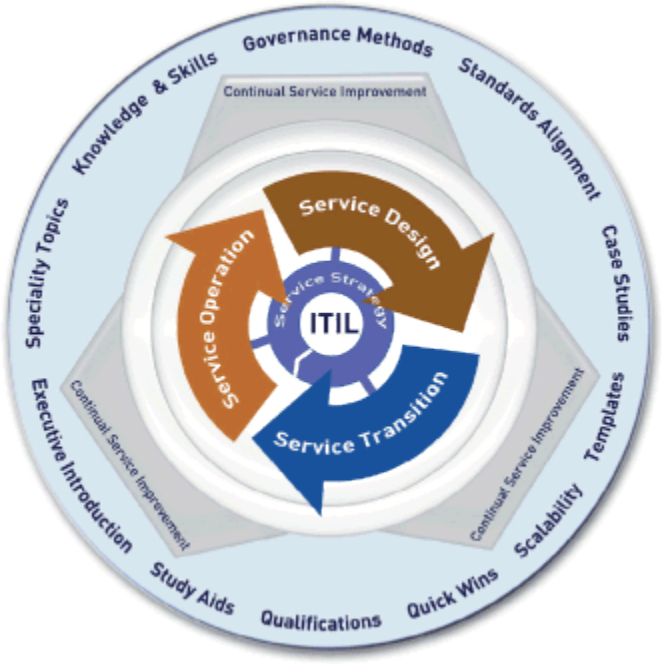
Continual Service Improvement

This volume provides instrumental guidance in creating and maintaining value for users through better design, introduction and operation of services. It combines principles, practices and methods from Quality Management, Change Management and Capability Improvement. Organizations learn to realize incremental and large-scale improvements in service quality, operational efficiency and business continuity. Guidance is provided for linking improvement efforts and outcomes with Service Strategy, Service Design and Service Transition.

Some of the benefits of ITIL to the Organization include:

- Structured approach: ITIL covers all the major areas of interest that concern to IT leadership within an organization. It's structured and systematic approach mean that it will allow managers be more effective in implement processes beneficial to IT within the organization.
- Good foundation upon which to build: There is nothing in ITIL that is superfluous or unnecessary in the absence of a defined system. ITIL is an excellent starting point from which to build your IT service management system.
- Can be used to help prevent knowledge loss from the organization: The documented procedures and requirements for documenting activities undertaken by the IT organization mean that exit of key IT personnel will leave less of a void than previously.

- Improved decision making and optimized risk: Prescriptive nature means not too much thought has to be put into decision making as ITIL is an already optimized framework.
- Encourages the use of flow charting techniques to map out business processes: Visualization of business processes is often the first step to process improvement. Having documented and defined the process graphically it becomes readily accessible to everyone within the organization and can the diagrams can become an invaluable troubleshooting and improvement tool.
- Consistent usage of defined terminology across the industry promotes understanding and simplifies communication: This is possibly the greatest benefit that ITIL brings to the industry. A common vocabulary allows us all to communicate more effectively and enables closer comparison of like with like.
- Traceability and accountability: With structured systems come the ability to formally trace and review what was done about any particular incident or problem. Such audit trails are an invaluable aid to piecing together a picture of what transpired and allow even those not directly involved with a case to get up to speed quickly and contribute if appropriate.
- Ambiguities and vagueness in definitions give you flexibility: ITIL is a loose framework of guidance notes and as such has sufficient holes to allow to operate in many different ways while remaining in alignment with ITIL general direction.
- Increased user satisfaction with IT services: ITIL is a service based platform and user satisfaction is at its core.


Governance Methods
Standards Alignment
Case Studies
Templates
Scalability
Quick Wins
Qualifications
Study Aids
Executive Introduction
Speciality Topics
Knowledge & Skills
Continual Service Improvement
Service Design
Service Operation
Service Strategy
ITIL
Service Transition
Continual Service Improvement
Continual Service Improvement

Chapter 4: Final Deliverables and Timelines

4.1 Final Project Deliverables:

1. IT Assessment of Current State of Information Technology at New Hanover Community Health Center, to include:
   - Inventory of all Information technology hardware with the Health Center and their locations.
   - Inventory and detailed description of all software systems used within the Health Center.
   - Use Case Diagrams describing all software systems used in New Hanover Community Health Center and actors involved.
   - Business flow diagrams for patient activity within New Hanover Community Health Center, highlighting the various departments.
   - Current network architecture for New Hanover Community Health Center.
2. Revised Information Technology User Policies for New Hanover Community Health Center.
3. IT Strategy: This will consist of recommendations to meet the needs listed and suggestions for implementations.

4.2 Final Deliverables and Expected Results

1. IT Assessment of Current State of Information Technology at NHCHC:
   - Inventory of all Information technology hardware with the Health Center and their locations.

- Inventory and detailed description of all software systems used within the Health Center.
- Use Case Diagrams describing all software systems used in New Hanover Community Health Center and actors involved.
- Business flow diagrams for patient activity within New Hanover Community Health Center, highlighting the various departments.

2. Current network architecture for New Hanover Community Health Center: Revised Information Technology User Policies for New Hanover Community Health Center.
3. IT Strategy: This will consist of recommendations to meet the needs listed and suggestions for implementations.

- Recommendations for Improved and more efficient system for user support.
- Recommendations for IT Maintenance schedule.
- Recommendations for Hardware purchase and replacement plan.
- Recommendations for meeting Server needs.
- Recommendations for Backup/Storage needs.
- Recommendations for Phone System.
- Recommendations for User Workstations.
- Recommendations for Improved Wireless network efficiency.
- Recommendations for Sage vs MediaDent Communication breakdown.
- Recommendations for MediaDent Updates Management Schedule.
- Recommendations for MediaDent Training for Dental Staff.
- Recommendations for Customer feedback system.
- Recommendations for Improved social media presence.

- Recommendations for User Training needs.
- Recommendations for Staffing needs.
- Recommendations for Improved Web presence.
- Recommendations for Email Management spam messages.

Chapter 5 – Recommendations and Conclusion.

This Chapter will be proposing solutions for the various needs pointed out in the while doing the IT Assessment at NHCHC. I have listed the recommendations in priority order starting with the High Priority recommended solutions.

5.1. Phone System Solution for NHCHC.

Priority: High

Justification: NHCHC is striving to become a Patient Centered Medical Home. Our priority is to satisfy our patient's first as seen in our Mission Statement. Cases of dysfunctional phone transfers, constant dropped calls, automatic answering options not working is beginning to affect patient satisfaction and needs to be checked as it is already becoming a major cause for concern within the Health Center.

5.1.1. Problem Statement

As pointed out in the needs assessment portion the Phone situation at the Health Center is really a major cause for concern. Issues we face on a regular basis range from automatic answering options not working to phones just randomly failing during the day, random dropped calls etc. Our present phone system is supported by one of our IT Vendors Divergintz Data Vox Solutions. On several occasions they have provided support, made recommendations on actions to be taken but somehow the issues with the phone system still persist. I think NHCHC is due for a phone system replacement.

Some factors to consider in choosing a phone system

- Audio conferencing: An audio communications session among three or more people who are geographically dispersed. This function will be especially useful for board meetings and

other meetings where CEO or certain members of staff are unavoidably absent and still have to participate in a meeting.

- Videoconferencing: The system should allow a two or more locations to communicate by a two-way video and audio transmission. This is by no means priority in the list of phone system requirements at NHCHC but will be definitely a great addition. Some benefits include.
- Mobile softphones; for using a computer as a phone.
- Automated attendant: An automated attendant is a function of a business telephone system that automatically greets callers with a prerecorded message and then routes the call to the proper extension. This is based upon menu options that the caller selects by pressing the appropriate keys on their telephone or by speaking particular words. This eliminates the need for need for a human phone operator and enables NHCHC optimize its human resources by assigning staff in places where they are most needed.
- Paging and intercom.
- Presence technology: the ability to quickly identify who within your organization is available at any given moment, as well as the best way to reach them
- Wireless IP phones, enabling workers to access data and be easily reachable, even as they roam about a sales floor, warehouse, or other location
- Integration with a customer relationship management (CRM) system
- Unified messaging, with notifications by e-mail, text message, or phone

5.1.2. Background on Hosted Phone System Solution

The most popular and effective alternative to legacy phone systems is a cloud-based phone system, also known as a Hosted PBX. Hosted PBX is an Internet-based phone system that is hosted by one provider, reduces complexity and costs for small to mid-size businesses, and is far cheaper than traditional phone systems. Over the past few years, adoption of the hosted communication model has gradually begun to accelerate, building on voice to include additional services and applications, such as voicemail transcription, conference bridges, paperless fax, and other services.

Benefits of Hosted Solution:

1. With a hosted PBX solution NHCHC can focus on growing the company and other important aspects of the business and worry less about a constantly failing phone system.
2. Because most Hosted system vendors have implemented hosted solutions severally in several places they already have learnt by experience how to avoid the pitfalls that come with deploying these systems. Companies also save time and resources because hosted providers use proactive and reactive monitoring systems to resolve problems faster than an in-house solution.
3. Total cost of ownership is lower. The only equipment required for hosted VoIP is a switch, router and user handsets. This is not so for existing PBX system at NHCHC.
4. Phone calls are secure for remote employees. While an IP PBX uses unmanaged broadband connections to connect telecommuters to the phone system, hosted providers can leverage facilities and expertise to do this securely.
5. Hosted systems are designed for almost limitless scalability and can treat multiple locations as one office. The benefits of connecting all offices to the same phone system

include the ability to share a centralized receptionist and use free four-digit dialing between locations.

6. With Hosted VoIP access to latest technology is guaranteed. Service Providers handle software upgrades at no additional charge to the Health Center.
7. Hosted VoIP satisfies NHCHC business continuity and disaster recovery needs. Hosted providers house their equipment in carrier-grade collocation facilities with high levels of resiliency, back-up power and advanced safety features. An IP PBX reside in the client's office where it is susceptible to emergencies such as fires, floods or natural disasters.

Risks of Hosted PBX Solution

1. Quality, reliability of the system is dependent the Internet connection. If single failure exists it can isolate the communication and also have redundancy problem. It is an internet connected device and has the problem of hacking and there is a chance to get password lost, hackers may capture your network data packets which could lead to entire NHCHC network being compromised.

2. Pay full rate for little-used extensions

3. No end to payments, no eventual ownership of equipment

4. Messages, prompts and call records reside in service provider’s data center. This could a Confidentiality concern especially for NHCHC where confidentiality of patient information is paramount.

5.1.3. Recommendation

My recommendation for a fix to NHCHC phone situation will be a hosted Phone system. Hosted VoIP simplifies life for the NHCHC business executive, making it a better solution, especially for organizations like ours without extensive IT resources.

5.2. NHCHC Server Management and Administration.

Priority: High

Justification: NHCHC servers and server room form the backbone of Information Technology at the Health Center and so is key and sensitive to the daily operations of the Health Center. Any mishap will be a total disaster for the business and so there no precaution taken that is too early or too important.

5.2.1. Problem Statement

Server needs (space, physical security, administration): NHCHC houses six servers. These servers serve various purposes within the Health Center. Some of the services provided on these servers include Active Directory, DHCP for dynamic IP addressing for network devices, DNS for name resolution services, File services, Microsoft Exchange, Internet Information Services (IIS), PhoneTree system, Sage Intergy Suite services, MediaDent, Sage Practice Analytics.

Some concerns with server management at NHCHC include

1. Location: The servers initially were all situated in the Server room. This housed five of the servers before the introduction of the dental server that hosted MediaDent – the electronic dental record software. The challenge is that at both locations the doors leading into server rooms are open most of the time during work hours and after hours. The Server room is very accessible to all staff during work hours and after hours janitorial and cleaning staffs also have access. This is a potential Health Insurance Portability and Accountability Act (HIPAA) violation considering the fact these servers house most patient records and also other crucial information.

2. Space: With six servers located in one site, a lot space is used up. Presently at NHCHC it is almost impossible for 3 people to conveniently move around in the server room. The amount of power used up by these servers is also considerably high, which translates into high power bills for NHCHC. Having multiple servers also limits the flexibility in server management because it is a one server one service system and so Administrator can work on only one server and service at a time. Multiple servers also require more man hours and skill to properly administer. There is a need to shrink the space required and used by these servers while still keeping all the services they provide separated. A solution for this will not only create space but also reduce the amount of power consumed within the health center and man hours used up in server management thereby making more efficient use of System Administrators time and saving the Health Center a significant amount of money.

5.2.2. Virtualization Overview

The term virtualization broadly describes the separation of a resource or request for a service from the underlying physical delivery of that service. With virtual memory, for example, computer software gains access to more memory than is physically installed, via the background swapping of data to disk storage. Virtualization abstracts the underlying physical structure of various technologies (VMWare). Virtualization, in computing, is the creation of a virtual (rather than actual) version of something, such as a hardware platform, operating system, a storage device or network resources.

Virtual infrastructure gives administrators the advantage of managing pooled resources across the enterprise, allowing IT managers to be more responsive to dynamic organizational needs and to better leverage infrastructure investments.

Server virtualization

- Creates multiple isolated environments.
- Allows multiple OS's and workloads to run on the same physical hardware.
- Solves the problem of tight coupling between Operating Systems and hardware.

(Eisen, 2011).

Benefits of Server Virtualization:

I. Get more out of existing resources: Virtualization creates a pool common infrastructure resources and break the legacy "one application to one server" model with server consolidation.

II. Reduce costs by reducing quantity of physical infrastructure and improving server to admin ratio: Fewer servers and related IT hardware means less space is used, less power is power is used and reduced cooling requirements. Better management tools allow for improved server to admin ratio so personnel requirements are reduced as well.

III. Increase availability of hardware and applications for improved business continuity: Virtualization gives the flexibility to securely backup and migrate organization's entire virtual environments with no interruption in service. It helps reduce or eliminate planned downtime and immediate recovery for any unplanned issues.

IV. Improve desktop manageability and security: Virtualization makes it easy to deploy, manage and monitor secure desktop environments that users can access

locally or remotely, with or without a network connection, on almost any standard desktop, laptop or tablet PC.

(vmware, virtualization basics).

Risks of Virtualization (Eisen, 2011).

- Virtualization may not work well for
    - Resource-intensive applications. VMs may have RAM/CPU/SMP limitations.
    - Performance testing.
    - Hardware compatibility testing.
    - Specific hardware requirements; Custom hardware devices
- Some hardware architectures or features are impossible to *virtualize.*
    - Certain registers or state not exposed.
    - Unusual devices and device control.
    - Clocks, time, and real-time behavior.

5.2.3. Recommendations for Server Management and Administration

After significant study of the NHCHC server situation I have come up with the following recommendations to improve server management and administration at NHCHC.

1. Physical Security:
    i. Lock Server Room Doors – The server room doors should be locked whenever room is not occupied. There should be rules/ policies to enforce this. The policy should also specify individual(s) who have the key or key code to access the room. These measures will prevent unauthorized access to the server room and all the equipment like routers, servers, switches etc. stored in it (TechRepublic, 2007). It

also protects all invaluable information and reduces the chances of any business threatening activities. The server room is the core of NHCHC's network and the business as a whole.

ii. Set up Surveillance: Even with locks on the door, someone with authorized access can still abuse the privilege. It is necessary to have a system to determine who goes in and out of the server room and at what time. A log book would be the primary solution but has a major drawback in the sense that anyone with malicious intent can easily by pass it. A better solution will be a system with some kind of authentication incorporated into the locking devices so that a record is made of the identity of anyone who enters. A biometric scan or smart card could serve this purpose. A video surveillance camera placed in a difficult to reach and impossible to disable location but yet giving a good view of persons entering and leaving the server room should then supplement the electronic access or log book. The surveillance can be set up to monitor continuously or using motion detector technology so it only records when movement is sensed. The surveillance can even be set up to send some kind of notification if activity is detected when there shouldn't be like after hours (TechRepublic, 2007). NHCHC already uses card readers in several locations and so I believe implementing an extra one will not be an extreme difficulty. We also already have surveillance system at the front desk area so a duplicate of that for the server room area I believe is also a feasible project.

2. Server Virtualization: After considering the issue of space management and maximal management of server resources I decided server virtualization is the technology

solution to alleviate this need. Server virtualization is the process of partitioning a physical server into smaller virtual servers to help maximize server resources. According to proposal (Earney Consulting, 2012). Virtualization of NHCHC servers will involve the following process

I. Creation of a new virtual 2008 R2 Domain Controller: This upgrade will move the existing domain structure to a 2008 R2 environment allowing greater active directory recovery and additional security and policy considerations.

II. Creation of a new virtual 2008 R2 Exchange 2010 Server: This will move the existing Microsoft Exchange 2008 server application and all user email storage to the newest Microsoft Exchange version and place all data within its own dedicated virtual server.

III. Creation of a new virtual 2008 R2 File Server: This addition will move all user data from existing main server, to include company shared folder, personal documents, any user roaming profiles to a dedicated virtual server.

IV. Creation of a new virtual 2008 R2 Print Server: This addition will centralize the installation, management, and deployment or a network based printers within the organization.

V. Creation of a new virtual 2008 R2 Server with the Remote Desktop Role (Terminal Server): This will provide a dedicated remote access server for select users who need to remote access to securely access the NHCHC network. This will include an SSL certificate install to encrypt the connection from external sources.

NHCHCSage and Dental Server that host Sage Intergy Suite and MediaDent respectively will stay independent. This is because they are running built according to specifications for hosting those services and are still supported by both vendors. Implementing virtualization will shrink number of servers at NHCHC from seven to three thereby reducing amount of infrastructure and creating more space in the Server room. This will make managing them a lot easier, more services are available using fewer resources, optimization of power and cost.

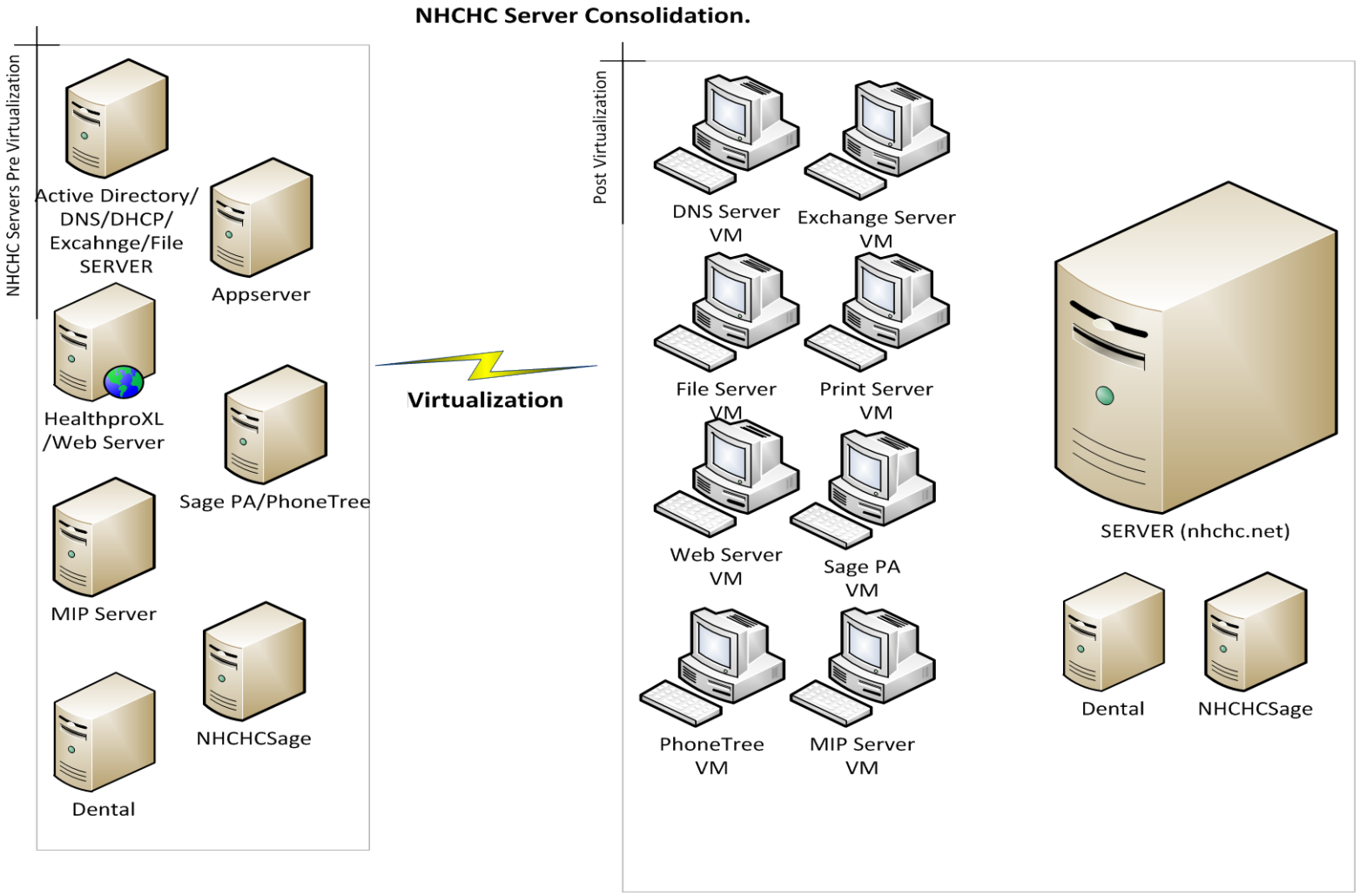

NHCHC Server Consolidation.
NHCHC Servers Pre Virtualization
Active Directory/ DNS/DHCP/ Excahnge/File SERVER
Appserver
HealthproXL /Web Server
Sage PA/PhoneTree
MIP Server
NHCHCSage
Dental
Virtualization
Post Virtualization
DNS Server VM
Exchange Server VM
File Server VM
Print Server VM
Web Server VM
Sage PA VM
PhoneTree VM
MIP Server VM
SERVER (nhchc.net)
Dental
NHCHCSage

Figure 5a.

5.3. Improved Service Operation Solution.

Priority: High.

Justification: Service Level Management and Service Operation defines standards for how IT is run on a day to day basis. User satisfaction and patient experience is directly and daily affected the standard of service operation.

5.3.1. Problem Statement:

User support is one of the main roles I perform on a daily basis. In a bid to create a more effective way to handle that I implemented a ticketing system using pdf forms. This has worked but there its still a hassle generating reports based on this. a more effective system was required. Apart from user support I needed something to help constantly monitor the state of every service, software, workstation, printer etc. on the NHCHC network without having to physically get to all of them as I am the only IT staff.

5.3.2. Service Operation Overview

Service Operation is a guide under the ITIL framework designed to make sure that IT services are delivered effectively and efficiently with a business **(Zentex University, 2009)**. This includes fulfilling user requests, resolving service failures, fixing failures as well as carrying out routine operational tasks.

Some Service Operation Functions include the following

- IT Operations management: This is responsible for operating the organization's IT infrastructure and applications on a day-to-day basis.
- Application Management: This will manage applications through the totality of their lifecycle. This starts with the first business ‘idea’ and completes when the application

is taken out of service. Application Management is involved in the design, testing and continual improvement of applications and the services that the applications support.

- Technical Management: This is the function that provides the resources and ensures that knowledge of relevant technologies is kept up to date. Technical Management covers all the teams or areas that support the delivery of technical knowledge and expertise. This includes teams such as Networks, Mainframe, Middleware, Desktop, Server and Database.
- Service Desk: This conducts a number of processes, in particular Incident Management and Request Fulfillment. The Service Desk is made up of a group of staff trained to deal with service events. Service Desk staff will have access to the necessary tools to manage these events. The Service Desk ought to be the single point of contact for IT users within an organization.

Some service Operation processes include:

- Incident Management: The objective for this is to manage the lifecycle of all Incidents with the intent being to return IT service to users as quickly as possible.
- Request Fulfillment: The objective here is to fulfill Service Requests, which in most cases are minor or standard Changes e.g. requests to change a password, or requests for information.
- Access Management: here the objective is to grant authorized users the right to use a service, while preventing access to non-authorized users. The Access Management processes essentially execute policies defined in Information Security Management. Access Management can also be referred to as Rights Management or Identity Management.

- Problem Management: Objective here is to manage the lifecycle of all Problems. The primary objectives of Problem Management are to prevent Incidents from happening, and to minimize the impact of incidents that cannot be prevented. Proactive Problem Management analyzes Incident Records, and uses data collected by other IT Service Management processes to identify trends or significant Problems (Brewster, Griffiths, Lawes, and Sansbury, 2010).

Each of the stages of the ITIL Service Lifecycle adds and provides value to the business. Service Operation is the visible face of the IT department to all the users. Effective and efficient delivery of service is what is expected of Service Operation.

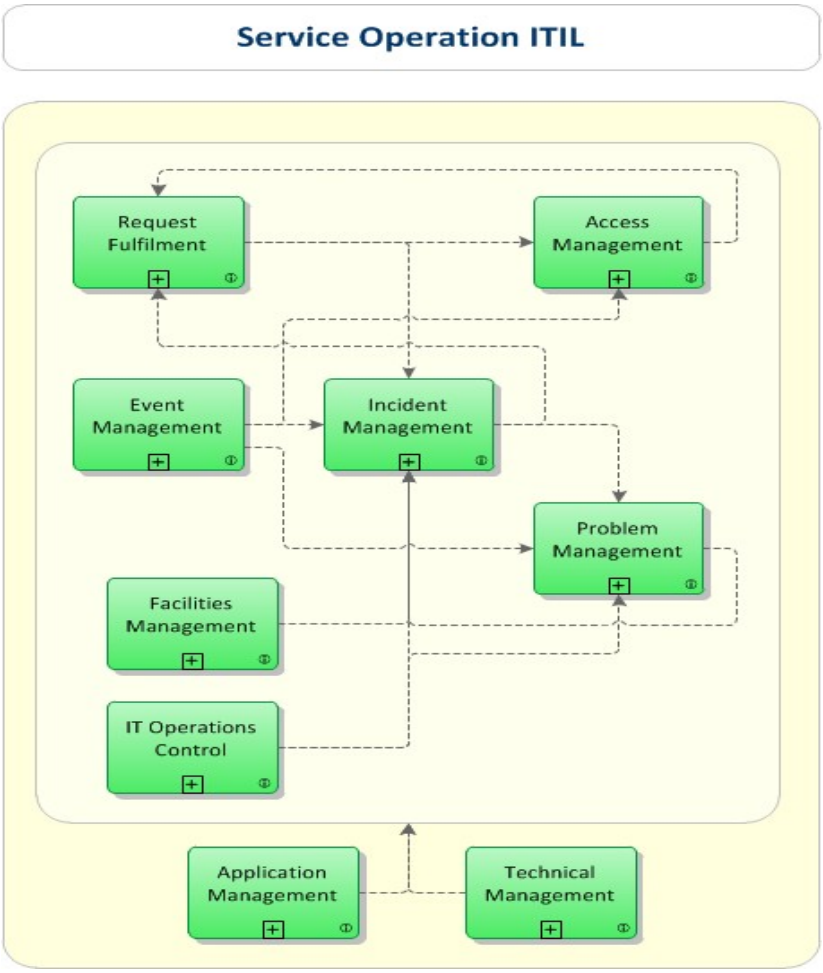


Fig 5b.

5.3.3. Recommendation

My main role as system administrator at NHCHC has been to ensure the smooth running of IT department and all IT related facets of the business. From daily user support, systems maintenance, resolving failures, staff training etc; my role is to ensure all these come together and there are hindrances to an effective business flow at NHCHC. ITIL Version 3 framework has a defined of process for managing of IT services with and across the business called Service Operation which I have described in detail above.

I have adopted a system at NHCHC called Spiceworks to help with overall management of IT system at the Health Center in conformance with the standards set by Service Operation. I have also adopted a maintenance plan and an IT training plan to conform with acceptable standards. I have a created a Preventive Maintenance Plan draft for use at NHCHC.

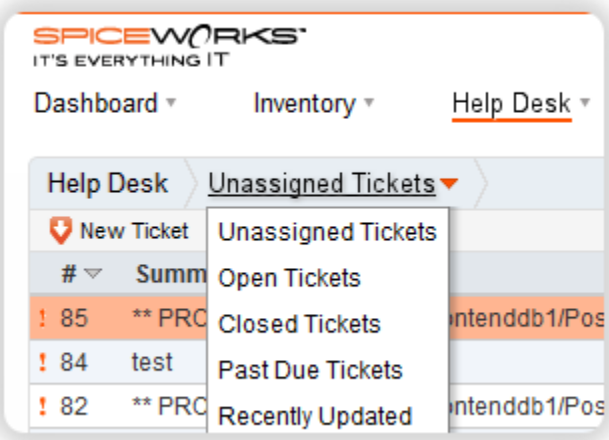
5.3.4. Spiceworks Desktop Application

The Spiceworks Desktop is a free, simple yet powerful multi-user web application that allows system administrator to inventory, monitor, report on and troubleshoot the network, run a help desk, and access a community of IT pros; all from one easy-to-use interface. The goal of the Spiceworks Desktop is simple: to simplify day-to-day management of technology within the organization. **(Spiceworks, 2012)**

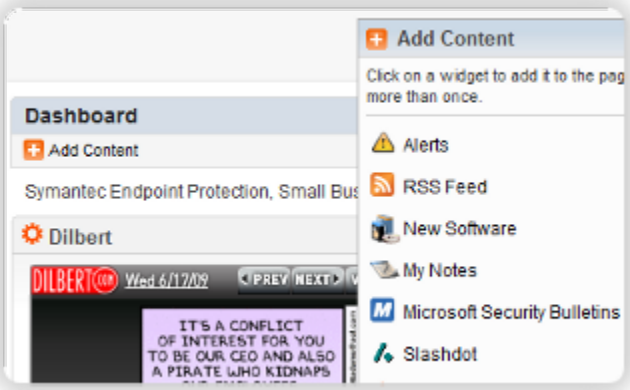
Spiceworks Desktop Main features:

IT Help Desk: Spiceworks has a helpdesk portal that is easy to use built into it. It can be used to track user requests, problems and issues and even to-do items. It also integrates

into NHCHC active directory so there automatically adds all nhchc.net domain users. The help desk systems lets allows for tracking of number of open tickets and how tickets have been assigned. Reports can also be run to track what devices or software take up the most time to support. **(Spiceworks, 2012)**



Spiceworks Dashboard: This is an integrated dashboard for practically managing everything. It gives a quick and easy view of everything from Help-Desk Tickets, Alerts, Inventory, and IT news, to any new hardware or software that was recently detected in the network environment. The dashboard can be customized to meet system administrator's needs. **(Spiceworks, 2012)**

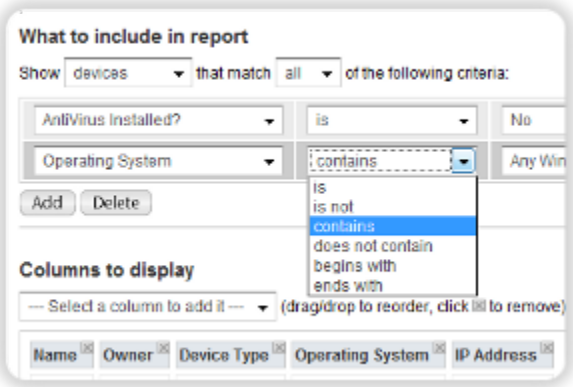


Accurate and Up-to-Date Inventory of Everything in your Network: Spiceworks automatically scans the network and discovers all existing hardware and software assets. These are categorized in groups like 'Workstations', 'Servers' and 'Printers' so they can quickly and easily find what you're looking for. Spiceworks also allows for creation of custom groups if the pre existing ones don't meet all the classifications required. Clicking on any device gives every information about that device including: configurations, available disk space, software installed, etc.

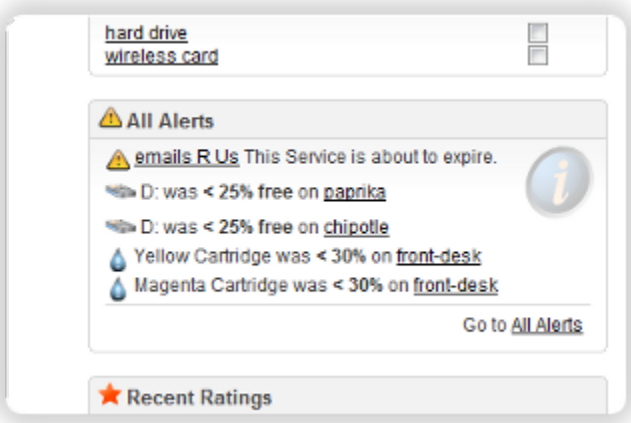
Spiceworks is not limited to only tracking assets found on the network. It can keep track of literally any kind of company asset that can be described or has an ID tag. But it's not just about static inventory. Spiceworks desktop can help locate problems and fix them. Network scans are updated nightly and the Timeline automatically highlights any configuration changes that have occurred since the last scan. Like new software installed, new devices on the network, new users added etc. **(Spiceworks, 2012).**

Spiceworks Reports: Spiceworks Desktop gives the ability to run custom reports whether monthly, quarterly etc. Several reports based on daily IT needs are built into Spiceworks out-of-the-box. Customizing reports are easy to generate, all it involves is selecting the type of report (hardware, software or tickets), the criteria, and what data should be

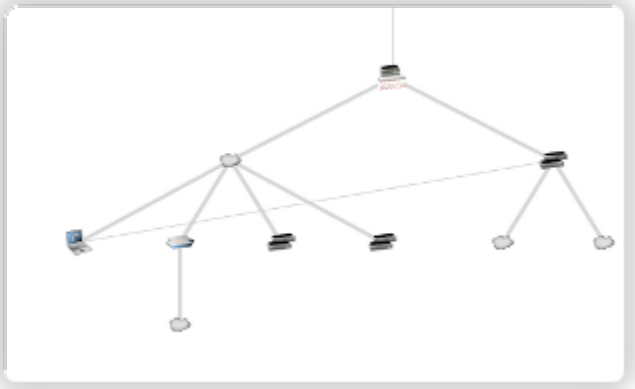
available in the report. All of these reports can be exported to any format desired. **(Spiceworks, 2012).**



Spiceworks Monitors: Spiceworks automatically monitors critical resources and activity that goes on in your network and notifies you if there is any change. For instance if there a disk drive that's running low Spiceworks attaches an alert to the disk drive or using too many licenses of MS Office etc. This feature comes by default with Spiceworks therby requiring no set up. It is also possible to customize the monitors so only needed notifications or alerts are received.



Network Map: The network map in a quick glance shows where everything is located or connected on the network. It has multiple views and ability to filter out and reduce clutter, filter out device types and instantly locate specific machines. The Network Map in Spiceworks makes it keeping track of the network easy. **(Spiceworks, 2012)**

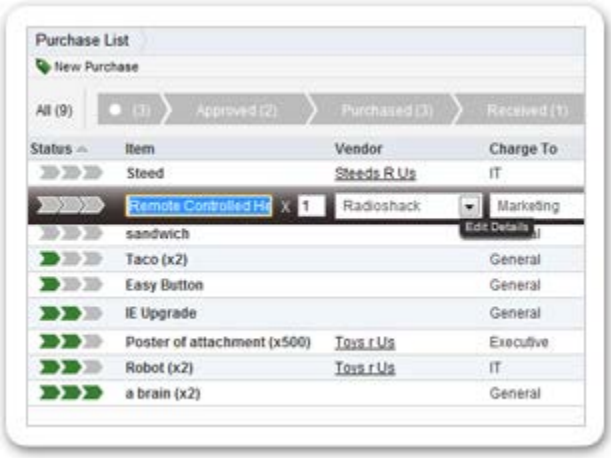


Spiceworks Community:

Spiceworks has an enormous IT online community that helps maximize use of the Spiceworks Desktop application by allowing memebers of the Spiceworks Community share experiences and exchange ideas.

Purchasing: Spiceworks has a built in workflow to manage purchases from when they are requested to when they are received. This also includes other built-in built-in metrics

covering pending approval, approved, purchased, and received. **(Spiceworks, 2012).**



People View:

The People view feature allows for incorporation of organization Active Directory into Spiceworks to get even more information in about help tickets and network inventory **(Spiceworks, 2012).**

5.3.5. IT Preventive Maintenance Plan for NHCHC:

For our network to work properly, every piece of the network has to work properly. Preventative maintenance is concerned with anything that can be done to prevent any component of the network from failing. Some of these may include user workstations, servers, routers, switches, access points, peripherals and even software running on these equipment. It is a good practice to have documentation detailing maintenance plan of the entire computing environment in an organization like NHCHC. This makes for greater reliability and stability of the overall network, all hardware and IT services hosted on the NHCHC site.

Some IT Maintenance activities include the following

- Scan hard disk file systems for errors
- Scan for viruses
- Clean CRT screen
- Defragment hard disks
- Scan for hard disk read errors
- Clean mouse
- Check for full hard disk volumes and remove unnecessary files
- Update virus definition files
- Check that power protection devices are still protecting the system
- Check power supply fan for ventilation and dirt build-up; clean if necessary
- Update emergency boot floppies
- Clean floppy disk-drive internals and read/write heads
- Check processor temperature; inspect heat sink and fan to ensure that they are working
- Check hard disk for temperature and vibration
- Back up CMOS information
- Clean exterior of case
- Clean exterior of monitor
- Check and clean interior, motherboard and expansion cards if necessary
- Check internal connections and cables
- Clean keyboard

See Appendix K for Proposed IT Preventive Maintenance schedule at NHCHC.

5.4.Integration of Dental Services

Priority Level: High

Justification of Level: Due to constant disruption of service experienced by NHCHC Dental because of Constant issues with our Electronic Dental Record System MediaDent in areas of availability of training, MediaDent vs Sage interfacing and more.

5.4.1. Problem Statement

As I mentioned in the assessment section this project, NHCHC has a lot of distraught experiences with MediaDent and all the software has promised to deliver. MediaDent was designed to interface with Sage Intergy our Practice Management Portfolio to pull patient information across both platforms. The objective was to make our check in process more efficient by eliminating the need for dental patients to check in multiple times when they visit the health center. This however has not always happened as seamless as the Health Center would want it to; on several occasions patient schedule and other information fail to transfer as needed to MediaDent.

Another concern at the health center with MediaDent has been in the availability of training. On initial launch of MediaDent very limited training was provided to dental staff, this has led to system being severely underutilized. Also as Dental department has staff turnovers with some old staff leaving and new ones coming in, the proficiency of use also diminishes. We have limited training available and this also is becoming an issue.

Random unplanned updates and patches being pushed is another issue of concern. On a few occasions dental staff has come into the office in the morning and launching

MediaDent to help with a patient it tells them to run and update before anything can be done with the system.

5.4.2. Background on Service Level Management (SLM)/ Service Level Agreement (SLA).

Service Level Management exists to ensure that services fully align with the needs of the business and meet the customers' requirements for functionality, availability and performance. The goal is to ensure that levels of service are negotiated and agreed with customers and all services are delivered to the agreed service levels defined in terms of agreed performance indicators. SLM must also ensure that services are continually improved where improvements are required by the customer and can be justified in terms of their cost. SLM is the steward of the relationship between the IT service provider and its customers and is accountable to the user for the services delivered (Brewster, Griffiths, Lawes and Sansbury, 2010). In this case the customer will be NHCHC and service providers will MMD systems (now SuccessEHS) owners of the MediaDent EDR solution.

The principal activities of SLM are:

- To develop and negotiate SLAs with customers;
- To ensure SLAs are underpinned by internal Operational Level Agreements (OLAs) and external Underpinning Contracts (UCs) agreements that support the achievement of agreed service levels;
- To act as a bridge between the IT service provider and the business;

- To manage and maintain positive, constructive relationships with the customer. As the primary interface between IT and the business, it must be kept up to date with all relevant developments.

Service Level Management provides a bridge between the IT service provider and the Business, operating as a focal point for customers and the business in their dealings with the IT service provider. Through regular contact and communication, SLM must represent the IT service provider to the Business, and the Business to the IT service provider. From its central position, SLM is able to build strong and effective relationships between the IT service provider and the business customers, managing their expectations and ensuring that delivered services meet or exceed those expectations (Brewster, Griffiths, Lawes and Sansbury, 2010).

Where one party delivers services to another, it is a good idea to have some kind of agreement setting out the basis on which the service is provided. Such agreements would normally contain, among other things, a description of what is to be provided, the key performance indicators, the way the service is to be charged for (where relevant) and the responsibilities of each of the parties. In ITIL SLM, the agreements between the internal IT service provider and the business customers that it supports are known as Service Level Agreements (SLAs) and it is through SLAs that SLM manages the relationship between itself and its customers (Brewster, Griffiths, Lawes and Sansbury, 2010).

ITIL defines a Service Level Agreement (SLA) as an agreement between an IT service provider and a customer (Zentex, 2009). In our case the Service Provider will be MediaDent and customer NHCHC. The SLA describes the IT service, records service

level targets, and specifies the responsibilities for the IT service provider and the customer. A single SLA may cover multiple IT services or multiple customers. SLA's could be service based, customer based or multilevel. According to (Zentex University, 2009) some of the SLA contents should include:

- Service description: This will be a simple statement describing what services MediaDent will be offering NHCHC and what relationship between both parties should look like.
- Scope: This describes the number of users that MediaDent as a service will be available to. This is probably going to be based on the number of licenses purchased by NHCHC.
- Service hours: The agreement should specify how many hours MediaDent will be available.
- Reliability: This should describe the maximum number of service breakdowns expected and the likely frequency of occurrence.
- Customer support: this describes what kind of help desk support will be available. The speed of response and criteria for escalating issues should be well specified. They will also specify at what level an issue should get to have someone on site.
- Service Performance: This will describe specific performance benchmarks to which actual performance will be periodically compared.
- Responsibilities: Other responsibilities for Service Provider (MediaDent) and Customer (NHCHC) has to be clearly specified and written down.
- Training: Frequency of training on how to optimally utilize software should be well defined in the SLA. This will also help keep entire staff abreast of any changes that

come with any updates or new versions. Other training materials should also be made easily available as reference for NHCHC dental staff. This will be very useful for new staff training.

SLA should also include how updates are to be managed. There should a detailed schedule for pushing updates and this should be well communicated. In the case where there is an urgent need adequate communication should happen to ensure NHCHC dental staff are not caught off guard. MediaDent should also clearly layout the nature of its relationship with Sage Intergy/Vitera and how well both systems can interface to guarantee maximum efficiency and performance.

5.4.3. Recommendation

My recommendation is to revisit the SLM contract with MediaDent. In that SLM details of the Service Level Agreement should be revisited and discussed point-by-point to reach a consensus. A new SLA should be generated based on the agreed upon solution and executed by each party.

In the case where terms of the SLA contract cannot be adhered to my next recommendation will be for move to another Electronic Dental Records system with proven results and are willing to fulfill terms of the SLA above. See Appendix I for table of various EDR systems and their rankings.

5.5. IT Staffing Solutions for NHCHC.

Priority: High.

Justification: There always has to be an on the ground IT person to ensure there are no emergencies with IT at NHCHC. Presently NHCHC sole IT personnel is an intern with limited availability.

5.5.1. Problem Statement

Presently New Hanover Community Health Center runs a one man IT Shop. The only IT staff the Computer System Administrator who works 20 hours a week and is supervised by the Deputy Director of the Community Health Center. The Computer system Administrator is responsible for supporting about 35 of the Community Health Center employees, managing the organization's network, working with all IT vendors, maintain Community Health Center website just to mention a few. With the increased volume of IT infrastructure and heavier dependence of NHCHC on IT the need for more available IT personnel is a issue to be paid urgent attention to.

5.5.2. Recommendations for Staffing needs.

My job title at NHCHC is Computer System Administrator (CSA). As CSA my job description is ranges from network administration and management to support, trainings and overall IT maintenance. The current situation however has the CSA as the sole on the ground IT staff. The CSA in addition to job responsibilities currently does all from vendor interactions, IT recommendations, website administration and occasionally database administration as required. CSA is also on a 20-hour week time schedule.

With the growth in IT infrastructure and greater dependence on IT for overall functioning and day to day activities at NHCHC there is a need for a upgrade in staffing requirements. The need more available and experienced IT staff cannot be over emphasized at this point. After consulting with some senior members of staff and other IT leaders from General Electric and also from my experience as present CSA I'll make the following recommendation for IT staff

1. I recommend the position of the System Administrator be changed to IT Manager instead of Computer System Administrator. This puts some more leadership and accountability on whoever occupies that position. It ascribes a more decision making role and makes it an even more sensitive role. See Appendix I for a Job Description and Expectation for Information Technology Manager Position.
2. Partnership with University of North Carolina Wilmington (UNCW) for Student Internship Programs: UNCW has a diversity of flourishing IT programs like (Management Information Systems) MIS, Computer Science (CS) and Masters in Computer Science and Information Systems (MS CSIS) programs. These programs provide a pool of very trained, intelligent and professionally hungry for experience students. This partnership will be a win-win situation for both NHCHC and UNCW in the following ways:
    - Providing professional opportunities and experience for UNCW MIS and Computer Science Students.
    - An opportunity for NHCHC to give back to the Community and also creates an avenue for UNCW MIS and CS to give back to the community while gaining relevant professional experience.

- NHCHC gets to benefits from UNCW student research and current creative ideas.
- Staffing concerns will be an almost forgotten issue as there'll always be a IT students.
- With interns IT manager can focus of more administrative issues and plan roadmap for IT growth since he/she doesn't have to bear the entire burden of IT at NHCHC alone.

5.6. IT Service Continuity Management (ITSCM) Solutions.

Priority: Medium

Justification: NHCHC already has some level of ITSCM implemented in the form of our current backup solution. This recommendation is more to standardize our processes and have more readiness in case of disasters.

5.6.1. Problem Statement

Though I specifically pointed out backup and storage IT Service Continuity goes beyond that especially for NHCHC since the Health Center depends heavily on IT. I mentioned in the need assessment section that NHCHC currently uses Buffalo High Performance share network storage drives for performing daily incremental backups and weekly full backups. While this has effectively served and met our immediate needs at NHCHC my goal is to paint and bring to light the bigger picture. Last year Wilmington experienced Hurricane Irene which though the effects were not ghastly at the Health Center could have been worse. With such threats looming especially with Wilmington being a coastal city Information Technology Service Continuity Management becomes strategically very important to NHCHC business.

5.6.2. Information Technology Service Continuity Management (ITSCM) Overview

ITSCM is one of the 5 components of Information Technology Infrastructure Library (ITIL). The main goal of ITSCM is to support overall Business Continuity Management process by ensuring that the required IT technical services facilities (including computer systems, networks, applications, telecommunications etc.) can be recovered within required business time frames **(TeamQuest, 2012)**.

Some IT Service Continuity Management activities include:

- Working with Business Continuity Management (BCM), undertake a business impact analysis (BIA). Identify the critical business processes and the potential damage or loss that may be caused to the organization as a result of a disaster. The BIA also identifies the form that the damage or loss may take; the staffing, skills, and facilities necessary to support business-critical processes; and the time within which critical services should be recovered (TeamQuest, 2012).
- Assessing risks, determining costs to mitigate those risks, and prioritizing which recovery plans will be developed through a Risk Assessment (TeamQuest, 2012)
- Translating recovery requirements into infrastructure options and data storage requirements (TeamQuest, 2012).
- Implementing and testing backup and recovery techniques, as well as negotiating and signing contracts for alternate site arrangements
- Periodically reviewing and refining plans to ensure they remain effective as business events dictate (TeamQuest, 2012).

Benefits to implementing ITSCM processes include:

- Minimizing disruption in IT services following a major interruption or disaster
- Minimizing costs associated with recovery plans through proper proactive planning and testing (TeamQuest, 2012).

- Properly prioritizing the recovery of IT services by working closely with BCM and SLM (TeamQuest, 2012).

5.6.3. Overview of Online/ Offsite Backup Solutions:

An online backup otherwise known as remote backup: Data storage and repository companies rent space on their servers permitting clients to store data there with variations on accessibility and sharing. These offerings range from consumer photo-sharing applications to those which allow business clients to share and collaborate on projects, documents, and other data. As stated in (Symantec, 2008) online backup data is automatically stored offsite, safe in the event of a natural disaster or when the need arises. Data is sent securely over the internet to a highly available data center managed by data protection experts. The administration console is accessible via a web browser. It is also suitable for an increasingly mobile workforce, as data can be restored from anywhere with an Internet connection.

Benefits of Online Backup:

The white papers (Symantec, 2008) and (Symantec, 2011) describes some of the benefits of Online backups.

1. Secures and protects company's data. After its staff, NHCHC's information is among its most important assets. Online data recovery solutions back up data electronically over the Internet to the vendor's data center. Industry best practice is for data to be encrypted while it is transmitted to the vendor and again at the vendor's data center. Storage in enterprise-class facilities provides additional security.
2. Ensures consistent, automated backups. Online backup solutions can be completely automated, and the vendor assumes much of the responsibility for the success of the

backups and restores. Some vendors offer 24x7 supports and provide a Web-based portal to view completed backups and backup version histories, initiate restores, and run reports.

3. Simplifies off-site protection. Online backup eliminates the need to physically transport tapes or removable external drives. Offsite protection without a vaulting service can be more affordable and doesn't require interaction with physical media that may be prone to failure.
4. Is fast and easy. Online backups can set up regular automated backups quickly with no need for dedicated or onsite IT staff. With vendors that support block level or incremental backup, after the initial backup, the service runs in the background, backing up only items that have changed.
5. Helps to keep data available. With aging computers as one of NHCHC issues online backup could be of immense help with preservation of data especially data stored on these aging computers or on hard drives that are not backed up regularly. Data center redundancy plans help keep information and applications available.
6. Reduces costs and allows access to advanced systems. With a subscription-based model, the cost of building and maintaining the infrastructure to support the backup application is spread across numerous customers, allowing the service provider to offer a sophisticated service at a lower cost than would otherwise be possible.
7. Increases business focus. With online backup solution NHCHC as a business and the IT Administrator have one less issue to worry about. Focus can be shifted to growing the business, leveraging technology further to boost profits, revenue, and productivity. Without having to worry about data recovery, NHCHC can focus on the

core business. With fewer servers to manage and fewer client computers failing, there's time to build competitive strategies that allow the organization to grow.

Risks of Online/Offsite Backup:

According to the publication (Perfect Backups) listed and described below are some risks of online/offsite backup.

a. Slow transfer times - Transferring hard drive content over the internet can take a substantial amount of time even if only essential data is to be transferred.
b. Privacy of your data - While most companies offering online backup services are legitimate there has to be some level of comfort having all our data on their servers and for a Health Center confidentiality of patient information is a big deal.
c. Continuity of service – Service or service provider might not be present or in existence; maybe bought over by new owners or company fails in the future and this could become a concern for the organization.
d. Security of transferred data – Data security as data is been transferred could be a concern. Though data encryption before transfer across servers should be able to mitigate this risk.
e. Time for data restoration – The question of how data can be restored in a critical one in Online Backup. Data may need to be downloaded of relatively slow connections and this might take a while.
f. Dependent on the internet – If internet connection fails for any reason retrieving data becomes an impossible task.

See Appendix H for some Recommended Online backup Service Providers.

5.6.4. Recommendation

To conform to ITIL's ITSCM requirements I recommend NHCHC implements an Online/Offsite Backup Solution. This will be great for NHCHC because it is situated in a coastal city with high proneness to Hurricanes. The Redundancy attribute of Online Backups also brings the rest of mind that there can never be complete or irrecoverable data loss and as data is stored redundantly is different locations.

5.7. NHCHC Desktop Computing Solution.

Priority Level: Medium.

Justification: Though this issue is really pressing and deserves instant attention, there are a few other issues that will still have to come prior like the Phone system replacement and implementing virtualization with the servers. Server virtualization is very important to take care of so as to have appropriate infrastructure to handle any virtual desktop infrastructure solution.

5.7.1. Problem Statement

As earlier stated the greatest IT support and maintenance concern at NHCHC is user workstation. Due to aging user workstations and limited support availability user individual user workstations are constantly having issues. Most of the time users experience sudden workstation breakdown.

5.7.2. Virtual Desktop Infrastructure (VDI) Overview.

Virtual desktop infrastructure (VDI) is the practice of hosting a desktop operating system within a virtual machine running on a centralized server (Alex, 2007). An easier definition would be using virtualization to provide your end users with desktops. (Kappel and Velte, 2009).

VDI is an area in which virtualization solutions are being tested and deployed to simplify end-user desktop provisioning and management, as well as to assist in the further reduction of IT budgets and operating costs.

Fundamentally, a VDI solution allows an organization to host virtual desktops on server farms within a data center and provide access to a virtual desktop from a variety of zero, thin or rich clients, ranging from stateless terminal devices to full-fledged desktop or laptop computers. With VDI, the desktop operating system and applications are stored and executed on data center servers, and the user interface is presented on client devices by using a remote desktop protocol. A VDI solution is composed of a combination of hardware, virtualization software, and management tools that provide an end-to-end solution to provision, configure, and manage virtualized desktops (Larson and Carbone, 2009).

Benefits of VDI.

VDI technologies leverage the benefits of virtualization technology to increase desktop deployment flexibility and centralize management of the end-user environment while providing the data security and manageability benefits of server-based desktop consolidation solutions. Windows Server 2008 Hyper-V Resource Kit (Larson and Carbone, 2009) below describes some benefits of VDI.

1. Hardware-Independent Virtual Desktops: VDI abstracts the underlying hardware from the workload (i.e., guest operating system and application stack) running in a virtual machine. Because a virtual machine presents a standard environment to the workload that is independent of the server hardware on which it is running and the client device used to access it, the number of images can be potentially reduced to a single base build containing a common set of services that can be used to quickly provision new virtual desktops.

2. Dedicated, Isolated, and Secure Virtual Desktops: The ability to encapsulate individual workloads in separate virtual machines (partitions) allows virtual desktops to be dedicated to individual users. Because virtual machines can execute concurrently, each in their own isolated and secured partition, application errors and guest operating system crashes that occur within a specific virtual machine do not affect virtual desktops executing in other virtual machines. In addition, dedicated virtual desktops can be rebooted, powered on, and powered off without affecting any other users, delivering an experience that is equivalent to that of a physical desktop.
3. Dynamic Application Delivery and Configuration: Separation of the application layer from the operating system further enables the single base image model for virtual desktops. Application virtualization with application streaming or server-hosted applications allows for applications to be decoupled from the base image so that virtual desktops can be personalized using dynamic, on-demand delivery of applications based on user role and group membership.
4. Flexible Resource Allocation: When a physical desktop is no longer able to deliver the performance required to run its several applications because of resource limitations, two choices are available: upgrade one or more hardware components (e.g., memory, graphics, and/or processor) or replace the desktop with a more powerful system. In both cases, the end user will experience a disruption in daily activities that can range from several hours for a hardware upgrade to possibly weeks or months of operation with degraded performance until a new desktop is procured and deployed.

In a VDI implementation, allocation of resources to virtual desktops can be performed from the supply pool available on the physical server. Whereas the majority of physical desktops do not support the addition of hardware without powering off the system, “hot-add” technology is prevalent among server hardware, allowing expansion of server resources as capacity requirements grow. If a server or virtualization service requires a restart prior to recognizing new hardware, or the server does not have available capacity to allocate additional resources, virtual desktops can be rapidly migrated to other servers with available capacity.

Additionally, virtual desktop resource allocation can be individually modified as workload performance requirements change. This is true for basic resources such as memory and processors, as well as other virtualized resources such as network adapters, disk controllers, and storage devices. In some cases, dynamic resource allocation, which does not require the virtual machine to be paused or powered off, may be an option. For other resources, it may be required to power off the machine before new resources are allocated. However, the disruption to the end user is measured in minutes, rather than in hours or days.

5. Rapid Desktop Provisioning and Decommissioning: Provisioning or decommissioning a physical end-user desktop in a traditional environment is usually a manual process that may take days to complete. In a VDI environment, the process can take place in a matter of minutes. Essentially, provisioning a new virtual desktop involves the creation of a new virtual machine from a base image and deployment of the virtual machine to an existing server. At that point, the user is able to connect to the virtual desktop from a client device using a remote desktop protocol. The process

to decommission a virtual desktop can be as simple as “unregistering” the virtual machine from the virtualization server and storing it in a library for archival purposes.

6. Rapid Desktop Migration: VDI solutions provide rapid desktop migration to support planned and unplanned hardware maintenance, and as a means to move virtual desktops to another server based on desktop performance requirements. In a physical desktop environment, even one where many personalization settings are network-based, migrating the desktop image to new hardware may require significant manual intervention and end-user downtime. In a VDI environment with centralized virtualization server farms and shared storage, as well as high-availability and load-balancing solutions, migrating a virtual desktop is a process that can be completely automated to minimize user downtime.

   For planned hardware maintenance or performance upgrade migrations, VDI provides the option to save the virtual machine state (including memory and register states) into files, suspend execution, migrate the virtual machine to another server in the server farm, and resume execution. If the server farm is connected to a shared storage such as a Storage Area Network (SAN), Network Attached Storage (NAS), or other similar infrastructure, the virtual desktop migration can be completed such that a user could reconnect to her virtual desktop within seconds and resume working where she left off. In the case of an unplanned hardware failure, VDI supports high-availability (HA) solutions that allow migration of virtual desktops to other server farm machines if the original server becomes unresponsive. In this case, the virtual machine state is not saved, but the virtual desktop can be reassigned to a new server that will allow the user to reconnect within minutes of the failure event.

7. Centralized and Secure Data Storage: One of the more problematic aspects of a physical desktop environment is the distribution of business data on potentially thousands of local hard drives. Of course, in most enterprises, file servers and policies are deployed to centralize, store, and secure data, but these measures do not guarantee that critical information won't be stored on a local hard drive or removable media. If there are also no reliable backups of the local storage devices, then there is the added risk of data corruption, loss of data, or data theft that can result in significant business impacts.

   In a VDI environment, especially one that uses thin client devices, users can access their virtual desktops locally while data remains stored and secured in the data center (e.g., SAN or NAS). Without local storage devices, the risk of critical data corruption, loss, or theft at this level is eliminated.

8. Centralized Backups: Along with the problem of distributed data on traditional physical desktops comes the issue of local data backup. Because physical desktops may be located across many local area networks (LANs) and even wide area networks (WANs) (not applicable to NHCHC), a single, simple backup solution cannot be implemented.

   In a VDI environment in which the virtualization server farms and shared storage are centralized in a data center, the backup process can also be localized to the data center network. With server backup technology that supports snapshots, a method that captures only the changes in data rather than backing up all the data repeatedly, not only can the impact of performing backups on server performance be reduced, but the

speed of backups can be improved, and the amount of data that has to be stored can be minimized.

9. Extensive Client Device Support: Whereas a traditional desktop environment usually requires the deployment of systems with a large number of components and complexity, a VDI environment provides an extensive choice of devices to connect an end user to a virtual desktop. For example, a VDI environment supports the deployment of thin client devices without a local client OS to users who perform a narrow set of tasks and do not need access to any local resources. It also supports connection from rich client devices (e.g., laptops) for mobile workers who require the ability to also work offline.
10. Cost Reduction: Cost Reduction is one that though not directly emphasized in the VDI attributes is key and very important to NHCHC as a non-profit organization. According to (Rouse, 2010) though desktop prices keep getting cheaper there are several other costs associated with maintaining a desktop environment. When speaking of desktops costs these are some factors to consider:

    - Purchase price and maintenance
    - Monitor and peripheral expense
    - The amount of power to run the desktop and peripherals
    - Operating system and application costs
    - Labor to build, deploy, move, and maintain

    In the publication by (Rouse, 2010) some risks of VDI may include the following

    - Printing often requires a 3rd party add-on

- PDA Sync not supported.
- Scanning is not natively supported
- Bi-Directional Audio is not natively supported
- Display protocols not suitable for Graphics Design
- Requires low-latency connection between the client and virtual infrastructure
- Requires Enterprise Class Server Hardware and Storage Area Network
- For VMs permanently assigned to specific users, these machines need to be patched just like a physical client computer.
- Requires IT Staff skilled with VMware and terminal server. These are usually different staff, as the people using VMware are historically using it for consolidating servers, whereas those skilled with terminal server or Citrix are used to dealing with end user applications and devices. Although talk of VDI does not typically mention terminal server, every XP Pro or Vista Remote Desktop Host is a single user terminal server.
- Does not scale as well as terminal server, which often can host 25 to 100 users per dual CPU server. VDI will likely scale from 10 to 20 VMs per dual CPU server, depending on how each VM is configured.

5.7.3. Recommendation

With respect to problem statement I want recommend NHCHC moves to a VDI as solution to its computing needs as opposed to multiple individual workstations like we use presently. Cost wise it also the best way to go for us. As mentioned earlier the

purchase price of a desktop, laptop, and all the accessories continue to go down by the day but they're still more expensive than a zero client computing device or a thin client device. A thin client device or zero client device like n-computing can be purchased at half the cost of purchasing a desktop or laptop, and the thin client device is going to use significantly less power and have much less maintenance time than a traditional desktop or laptop. From a hardware-only perspective, it tends to be about even from a cost perspective. When observed from the bigger picture of power and labor, VDI tends to win the cost argument every time. Specifically I also want to recommend N-Computing L-300 Virtual Desktop as VDI solution for NHCHC desktop computing needs. See Appendix G for VDI Vendor Recommendations.

5.8.Wireless Network Solution.

Priority: Medium

Justification: The need for a solution to NHCHC's wireless network situation is high but because of the urgency of other needs I put the priority for it as Medium.

5.8.1. Problem Statement

NHCHC consistently experiences breakdown with wireless network. This has on severally affected critical components of work being done at the Health Center as a lot of services depend on it. All medical providers use wireless on their laptops to stay connected to NHCHC network and so have constant access to patient information and electronic health records while moving through patient rooms. The Medical Assistants also use Notebooks with wireless networks to assistant medical providers in attending to patients. With all the unprecedented wireless network downtime it makes work extremely difficult and ineffective for all wireless users. Presently NHCHC network uses the Wi-Fi Protected Access (WPA) protocol which is relatively safe and secure compared to its predecessor WEP.

Our present hardware was purchased on recommendation by Sage (now Vitera) Solutions. They have provided support for these devices for a period but they have continuously broken. I am certain the main issues are with the wireless hardware (i.e. wireless router and wireless access points) is the age. Most of these devices especially router and wireless access points have come to the end of their useful life and are due for replacement.

5.8.2. Replacing a Wireless Router

Replacing a wireless router is not a very simple task. Attention has to be paid to needs of the Health Center and other router features.

Types of Routers

- Small business routers: These routers typically provide enough Wi-Fi coverage for a 1500- to 2000-square-foot, two-story office space. They'll provide four Ethernet ports for hard-wiring computers into the network or for adding other components, such as network-capable printers, network storage, or additional wireless access points for more Wi-Fi coverage (Geier, 2012).
- VPN Router/ Firewall: These routers unlike the small business routers have an integrated virtual private network server, and sometimes offer advanced features such as Virtual Local Area Network (VLAN) support and multiple Service Set Identifier (SSIDs) (Geier, 2012).
- Unified Threat Management (UTM) Gateway or Firewall: These routers include advanced features and usually are Ethernet-only with four to eight ports, thus requiring separate access points for Wi-Fi connectivity. In addition to serving as router and Internet gateway, as well as providing a VPN server and firewall, these units typically also include virus and malware protection, content filtering, anti-spam functions, and intrusion detection and prevention (Geier, 2012).

Factors to Consider in Selecting Wireless Router:

- Speed Ratings: Wireless routers typically advertise their speed in megabits per second (Mbps). Older Wi-Fi models offered 11 Mbps, mid-range 802.11g routers 54 Mbps and the latest 802.11n routers claim up to 450 Mbps (Mitchell, 2012). For routers, gateways, firewalls, and switches, focus on those models that support gigabit Ethernet (1000 mbps) for higher speeds on your hard-wired computers. Keep in mind the speed that each of your computers supports, which you can upgrade with a PCI or PCIe Ethernet card (Geier, 2012).
- Dual/Backup WAN: Because internet access is crucial to our operations at NHCHC, it will be good to put into consideration routers, gateways, or firewalls that have a second WAN port or that support a 3G/4G card for failover or load balancing in case main Internet connection goes down as has experienced on a few occasions (Geier, 2012).
- Power over Ethernet (PoE) Support: NHCHC's current wireless infrastructure has wireless access points running throughout the building and will be good to consider routers, gateways, firewalls, switches, and access points that support Power over Ethernet so that the power can run through the Ethernet cabling with the data. This feature can save time and money, in contrast to the effort it might take to place access points near electrical outlets or to run new electrical lines (Geier, 2012).
- Demilitarized Zone (DmZ) Support: For servers or any other device that needs direct access to the Internet, it is beneficial to consider a router, gateway, or firewall that has a dedicated DMZ port (Geier, 2012).
- Virtual Local Access Network (VLAN) Support to separate Traffic: Most business-class networking gear supports virtual LANs, which allow for creation of multiple

separate virtual networks inside a single network. We can create one VLAN for NHCHC private network (or more to support different departments and internal operations) and another for public access by patients and other visitors; this arrangement prevents patients and guests from connecting to NHCHC computers or snooping on our traffic.

- Quality of Service (QoS) Support to Prioritize Traffic: Most routers, gateways, and firewalls provide a Quality of Service feature that allows for prioritization of network traffic. For example, higher priority can be given voice and video traffic (from VoIP phones or Skype, for instance) since they're much more sensitive to lags than Web browsing and other traffic. Another example is giving a certain computer or device more priority than others, or less priority for guest access.
- Content Filtering to block inappropriate sites: Many consumer-level routers have a built-in feature to block specific sites, while more-advanced models and UTM gateways may have a more comprehensive filter to block adult sites, malware, and other inappropriate material automatically(Mitchell, 2012). This feature will definitely be useful for NHCHC to give staff access to only required websites. This will help all focus more on their jobs and improve efficiency.
- Warranties: Wireless Internet router manufacturers in most cases provide a warranty package together with their equipment. The length and terms of these warranties vary widely. A better warranty could be an indicator a manufacturer is more committed to support their products, while a lesser warranty could indicate a somewhat lesser standard of product quality or reliability (Mitchell, 2012).

5.8.3. Recommendation.

My recommendation to handle this issue is to replace existing wireless router and wireless access points with newer and more efficient ones based on the various considerations listed above. With replacement of existing wireless router and access points there will definitely be great improvement in staff efficiency and overall patient satisfaction as sudden and unjustifiable network downtime will be a thing of the past.

5.9. Collecting and Utilizing Customer Feedback

Priority: Medium.

Justification: Patient feedback is great and NHCHC values that. We already have a few similar things to this going on but limited in their objective e.g. the hand washing survey. Also several other solutions needed at the Health Center take priority over the need for a Patient feedback system.

5.9.1. Problem Statement:

As mentioned earlier in the Needs Assessment portion of this document, it is important for NHCHC to understand how patients see them. When patients have complaints it's much better they bring it to the Health Center than the general public. Presently patients do not have any opportunity or avenue to give except vocally to give feedback or bring concerns to the attention of Management or anyone within New Hanover Community Health Center. This has resulted in some patients giving negative reviews on Google and other avenues for issues that could have been discovered and taken care of within. This makes the need for a Patient feedback system more than crucial to the Health Center at this point.

5.9.2. Customer Feedback System Overview.

The need for patient and other client feedback cannot be overemphasized not just in NHCHC but any other business. Patients and customers generally always find ways to get

their voices heard either in praise of excellent service received, suggestions for improvement or flat out condemnation of services received. They have typically done this through various review websites, Google reviews etc. Most businesses have blind spots, and customers in our case patients are great at pointing them out. It will be a thing of note when NHCHC quickly acknowledges and repair it's areas of deficiency, then we will end up making with happier patients while increasing overall business value. A customer feedback system is one that can channel all the patient/customer energy and maximize all of its value. Customer feedback system range from software programs to surveys etc. Hearing from patients is very critical to NHCHC business.

Some of these customer feedback systems include 'Voice-of-the-customer' program, Closed Loop Alerting System by ConfirmIT and Customer Feedback Systems (CFS) by Nihilent.

Benefits of a Customer Feedback System:

According to (ConfirmIT) white paper below are some benefits of a Customer Feedback System.

- Retain patients/customers: By creating a dialogue with NHCHC patients via a customer feedback system, it will strengthen relationship with NHCHC and it's patients and use the opportunity to take speedy action patient expectations are not met.
- Turn dissatisfied patients/customers into advocates: Understand quickly where NHCHC has failed to meet patient needs, and provide a greater opportunity to turn those customers around and generate positive word of mouth.

- Win the Customer Service Battle: Customer service is a crucial battleground with many consumers willing to pay a premium for outstanding service. Use feedback to understand the patient experience provided at NHCHC from the patient's point of view.

Risks of a Customer Feedback System:

- Overhead: The system will probably be proprietary; NHCHC will have to pay for software developers, system administrators and maintenance people to keep the software running. There will also be need for regular backups and system upgrades to keep integrity of the system.
- Training: For a small organization like NHCHC training issues may be a small disadvantage. It can take away from productive time of our limited number of staff.

5.9.3. Recommendations:

a. Implement a customer Feedback System: The need and benefits of this have been discussed in detail above.
b. Analyze Website Metrics: This involves looking at what patients and all website visitors do on our site. We can accomplish this using a simple tool like Google Analytics (GA). All that is required is installing Google Webmaster Tools. Other tools like StatRaptor and Presto can also be used (Hunckler, 2012).
c. Monitor Social Media: There are several tools for monitoring social media. This will help us monitor who does what on our facebook page and any other social media we use. Some social media monitoring tools include SEOmoz Pro tools and Trackur and these tools are relatively cheap (Hunckler, 2012).

d. Customers Ideas: Sending out a simple survey gives the community and user base a voice. And from this patients/community voice NHCHC can find some of its most valuable nuggets of information. Use an online form builder, survey monkey etc. to create a short, engaging survey that encourages the community to share their ideas and provide feedback (Hunckler, 2012).
e. Set Up a ‘Suggestion Box’: I think by giving our patients, guests and staff a place to express their feelings, it goes a long way to show much we as an organization cares and that’s exactly the role of a suggestion box (Hunckler, 2012).

5.10. Website Improvements.

Priority: Low.

Justification: NHCHC already has a very functional, well managed and informational website.

Problem Statement:

NHCHC has a website www.nhchc.net which serves a valuable information resource for its patients. The website also has link to the Sage Patient Portal which lets patients have continues access to their patient information, records from visits to the Health Center and more. The website if definitely a key part of New Hanover Community Health Center's daily operations. Presently www.nhchc.net is hosted locally on the HealthPro XL server and this might not be the best option for the following reasons;

- New Hanover Community Health Center might need to hire extra staff for sole purpose of maintaining the website and hiring relevant expertise can be costly to the Health Center.
- This requires an extra server: right now NHCHC uses the old HealthproXL server as host machine for the website. This takes up space in the server room, uses up more power and still requires skilled personnel to ensure server is working the way it should.
- By hosting in house NHCHC network is vulnerable to external attacks as any successful security breach into the web server automatically means network security breach for the NHCHC network.

- It is just one more area to worry about that could be a distraction to the rest of the business and could be taken care of by hosting offsite.

Under the present leadership of NHCHC Chief Executive Officer Ms. Anganette Young, serious attention is being paid to rebranding NHCHC and improving its web presence.

5.10.1. Recommendations.

1. Off site web hosting: For this reasons mentioned in first paragraph above I recommend the NHCHC website www.nhchc.net be hosted offsite through a webhosting company. There are several reputable web hosting companies that provide services and peace of mind. Professional web hosts keep multiple professional communications grade backbone connections online, plenty of bandwidth is available and host internet is backed up and fully redundant. Also chances of exposing the NHCHC network to security breaches are removed. Most web hosting companies offer unlimited space, so web content can grow and increase without any space concerns. The cost of hosting website offsite is also alarmingly cheap compared to the cost of maintaining servers. With web site hosted off site NHCHC's limited IT personnel can focus on other matters important to the NHCHC maximizing time.
2. Overall Redesign: Redesign website with improvements on overall physical appearance to make website more inviting and representation of what NHCHC represents; a patient centered medical home. The new design should include some of the following features

a. Online Registration: The new re-designed website should have features to allow patients register and submit registration online. Registration done online should directly update Sage Intergy database to make operation seamless and efficient.
b. Online Payment: Provision should also be made for patients to be able make payments online. NHCHC has a policy that mandates treatment for all its patients whether have funds or not, however it is not a free clinic. With an online payment solution making payments will be more convenient for patients as they won't have to come on site.
c. Responsive Design: This means the website will automatically format itself properly to the viewing device including tablets, smart phones, laptops, desktops, and larger screens. According to webpronews.com half of US wireless subscribers use smartphones. As smartphone access continues to rise, those without computers will rely heavily on their cellular devices for internet access. A Responsive Design will guarantee that the website will look just as inviting on patients' and potential patients' smartphone screens as it will on a home computer
d. Facebook Feed: This portion of the site will offer the ability to post relevant content to NHCHC patient community via our Facebook page, directly to the website home page. This will allow NHCHC to continually update patients on upcoming events, any changes to the appointment process, new staff, or news that that needs to be shared in a hassle-free way. This will also help considerably with your Search Engine Optimization.

e. Fillable patient forms: on the patient resources page where the several patient forms are located it will great if forms could be filled and submitted online. Also the sliding scale forms should also be fillable and also allow for submission online.

5.11. Optimizing Social Media at NHCHC.

Priority: Low

Justification: Typically the responsibility of setting up and maintaining social media presence in an organization will fall under Publicity or Marketing departments. These however are not departments not presently in existence at NHCHC and so if a strong social media was to be established it will have to be made someone's responsibility. This will take from their time for other contributions within the Health Center.

5.11.1. Problem Statement

As mentioned earlier during needs assessment portion of this project, I highlighted the fact that NHCHC has failed to maximize the available free potential of social media and social networking.

5.11.2. Overview of Social Networking

Whitepaper by (AT&T, 2012) lists some notions about social networking in the workplace.

- Electronic tools can increase the number of active connections each person can maintain (human limit is around 150 stable relationships, the increased maximum is not known). Take any two people at random on the planet and they will be separated by an average of six degrees of separation5, meaning a person who knows a person who knows; virtually anyone can be contacted through 6 steps.
- Weak ties (contacts rarely seen and barely known) often create more value when you need help than strong ties.

- In every demographic set, for a given incidence (marketing campaign, application deployment), there is as much opportunity in the main target small group as in the numerous niches constituting the long tail: applications such as e-commerce and social networks are delivering value for and from this ‘long tail’
- The new generation just starting their working careers, also called the Millennials, is made up of digital natives born with a mouse in their hand, who have mastered the Internet and the PC and have a radically different approach to computing, with profound implications for the professional world.

Social Networking takes advantage of all the above notions to produce tools that foster collective intelligence, collaborative work and support communities: not only social networks, but also search engines, blogs, wikis, collaborative tagging (folksonomy) and instant messaging/presence features, at least, are part of the Social Networking movement.

It is a constantly changing area where applications integrate with each other and new features are regularly launched.

Some potential benefits of using Social Media for Businesses.

In his book (Brogan, 2010) the following were enumerated as some benefits of Social networking to a business

- Blogs allow chronological organization of thoughts, status, ideas. This means more permanence than emails.

- Podcasts (video and audio) encourage different types of learning in portable formats. These could be beneficial for staff trainings, making prior meetings available etc.
- Social networks encourage collaboration. They can almost replace intranets and corporate directories and promote non-email conversation channels
- Social networks amass likeminded people around shared interests with little external force, nor organizational center and a group sense of what is important and what comes next.
- Blogs and Wikis encourage conversing, sharing and creating.
- Social software like flicker etc. promote human mediated information sharing.
- Social news sites show popularity of certain information, at least within certain demographics.
- Social networks are full of prospecting and lead generation information for sales and marketing.
- Social network makes for great ways to understand the mindset of the online consumer should that be of value.
- Online versions of materials and media especially in formats that let permit sharing mean others are equipped to run with our message.
- Social media contain lots of information about prospective new hires, customers and competitors.
- Podcasts reach people who are trying new gadgets like droids, iPhones, iPods etc.
- Tagging and sharing on social media means information gets around much faster.

- Conversations spread around adding metadata and further potential business value.

Risks of Social Networking in the workplace:

According to studies by (Zeigler, 2012) below are some potential risks of Social Networking to a business.

1. Employee Productivity - Companies that allow employees to use Facebook during the work day lose 1.5 percent productivity. With its wealth of applications, games and status updates, employees may find themselves compulsively checking Facebook throughout the day instead of performing work-related tasks. Allowing employees access to Facebook and other social networking sites for business-related activities may have some benefits, but the distractions available on the websites often outweigh any benefits.
2. Employee Relations - Social networking has the ability to hurt employee relations within a company. Employees may send negative messages or harass one another through social networking sites and hinder their ability to work together. An employee who had a bad day at work may post an innocent status message or tweet about his day and another employee may relay that information to that employee's supervisor, resulting in tension in the workplace and resentment among employees. Additionally, social networking provides a way for employees to communicate with one another throughout the day without anyone overhearing, leading to an increase in off-task conversation.

3. Confidentiality and Company Image - Allowing access to social networking in the workplace opens a company up to potential breaches in confidentiality and a tarnished image. Workers may inadvertently post status updates or tweets about promotions or business information that the company is not prepared to release publicly. Employees may share confidential information through a social networking website and that information could be accidentally sent to the wrong person, leading to a leak of that information. Allowing employees to post about a company on social networking websites may also compromise the company's image when an employee posts something negative about the company and that post is shared among other social networking users.

5.11.3. Recommendation

After study of the merits of demerits of social networking and social media to a business I still recommend that NHCHC implement social networking for its marketing purposes to reach out and attract more social media users within the community and make them into patients. However strong restrictions should be placed on use of social networking at the workplace so worker productivity is not affected in any way because of staff members spending time on different social media sites being unproductive.

5.12. Conclusion

At the beginning of this document I stressed the growing importance of Information Technology to businesses today. This is the same for New Hanover Community Health Center; the importance and dependence on IT is on the increase by the day. This makes having an IT strategy very important. A IT strategy basically lays out long term plan for IT within the business with its main goal being to justify any investments the business makes into developing IT.

In this project I used the Y-Model to develop the strategy for New Hanover Community Health Center. I started with an IT assessment to determine the current state of the organization. With results from the assessment it was possible to determine what the various needs are NHCHC. Recommended solutions were proposed to meet the needs identified in the assessment phase. These recommendations were prioritized according the urgency of the need, likely availability of funds, predecessor projects, etc. The recommended solutions were also made to stay in compliance to ITIL specifications. The final steps the Y-Model which will also be the future work for this project is the implementation phase. This involves executing recommended solutions and evaluating results to ensure they are meeting the IT needs of the health center. For this phase to be successful there to has be combined effort from IT, operations and administration. However successful implementation will be largely dependent on availability of funding

for any implementation costs. It affects choice of vendors, quality of equipment to be purchased, required personnel, etc. The IT strategy is really about encouraging more investment into IT at NHCHC and justifying such investments, it is about stating the need, recommending a solution and justifying the need to invest to implement recommended solution.

A review of the strategy should be conducted on regular intervals to determine whether changes or new recommendations are required. The review can be conducted as increments and as evolutionary changes. Increments should be conducted as often as yearly with a large-scale review very 3 to 4 years. The large-scale review is designed to capture changes that occur due to shifts in services, technology, and interaction with the customer base or imposed federal or local mandates

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APPENIX A.

NHCHC Business Flow Diagrams

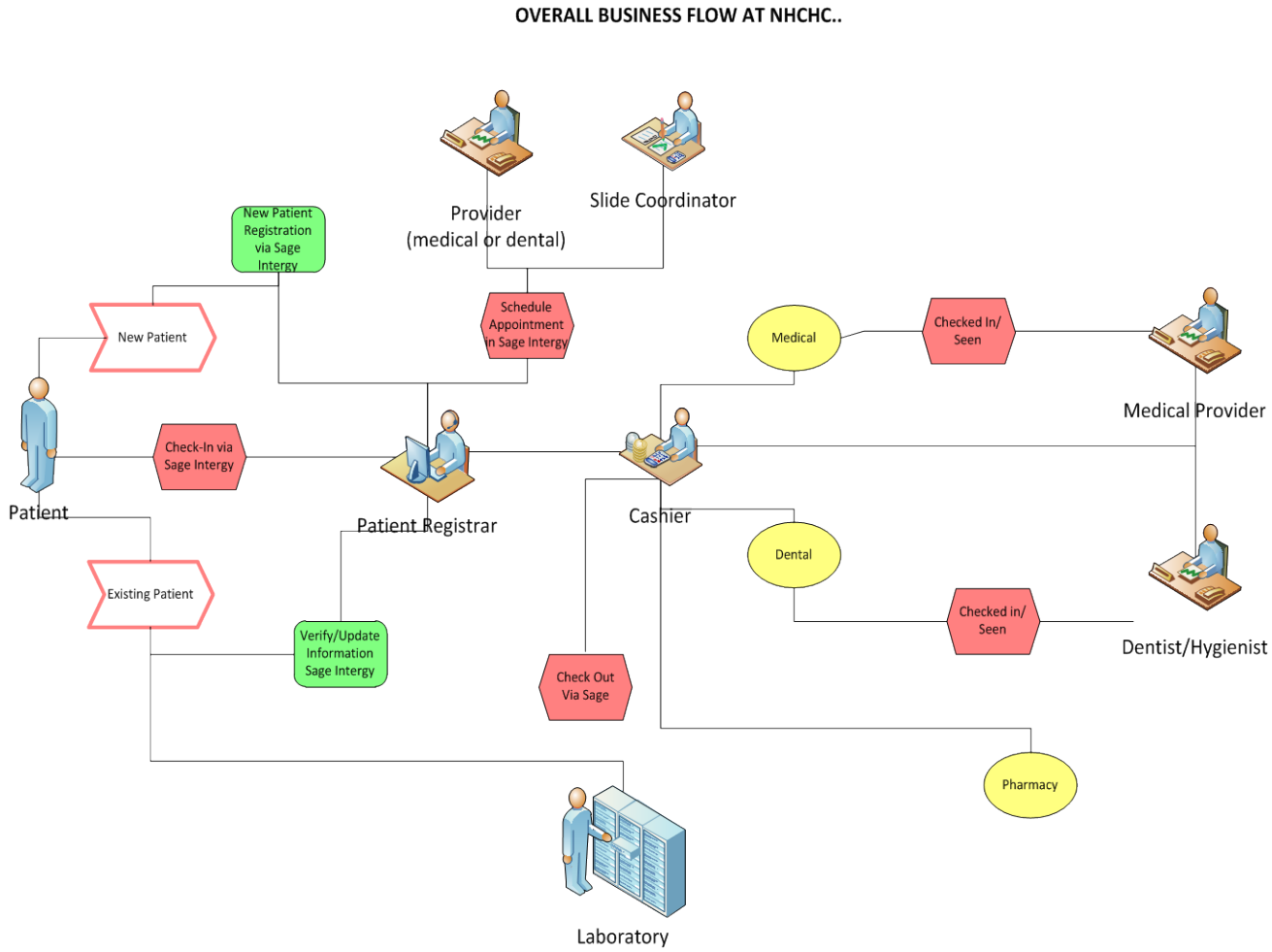


Figure 1a

Fig 1a. Overall Network flow diagram Description.

a. Patient walks in though NHCHC doors as either a new patient or an existing patient. The first interaction is with a patient Registrar who checks them in

New Patient

I. New patient has to get a new patient registration done. Patient registration is done in Sage Intergy
II. New patient can either schedule appointment to see slide coordinator or a medical provider
III. Next patient goes on to see cashier
IV. Patient then goes on to either medical or dental depending on where there is appointment is and gets attended to.
V. After being seen patients makes way back to cashier and makes any payments necessary.
VI. Patient then moves to check out with patient registrar. If they need a follow up appointment they also schedule this with the Patient Registrars.

Existing Patients

I. Existing patients have to update their information (i.e. address, phone number etc.)
II. If patient already has an appointment, patient goes on to see cashier
III. Patient then goes on to either medical or dental depending on where there is appointment is and gets attended to.
IV. After being seen patients makes way back to cashier and makes any payments necessary.
V. Patient then moves to check out with patient registrar. If they need a follow up appointment they also schedule this with the Patient Registrars.

VI. An existing patient can also head to the laboratory for various lab orders without having to check in with patient registrars or cashier and also check out like wise.

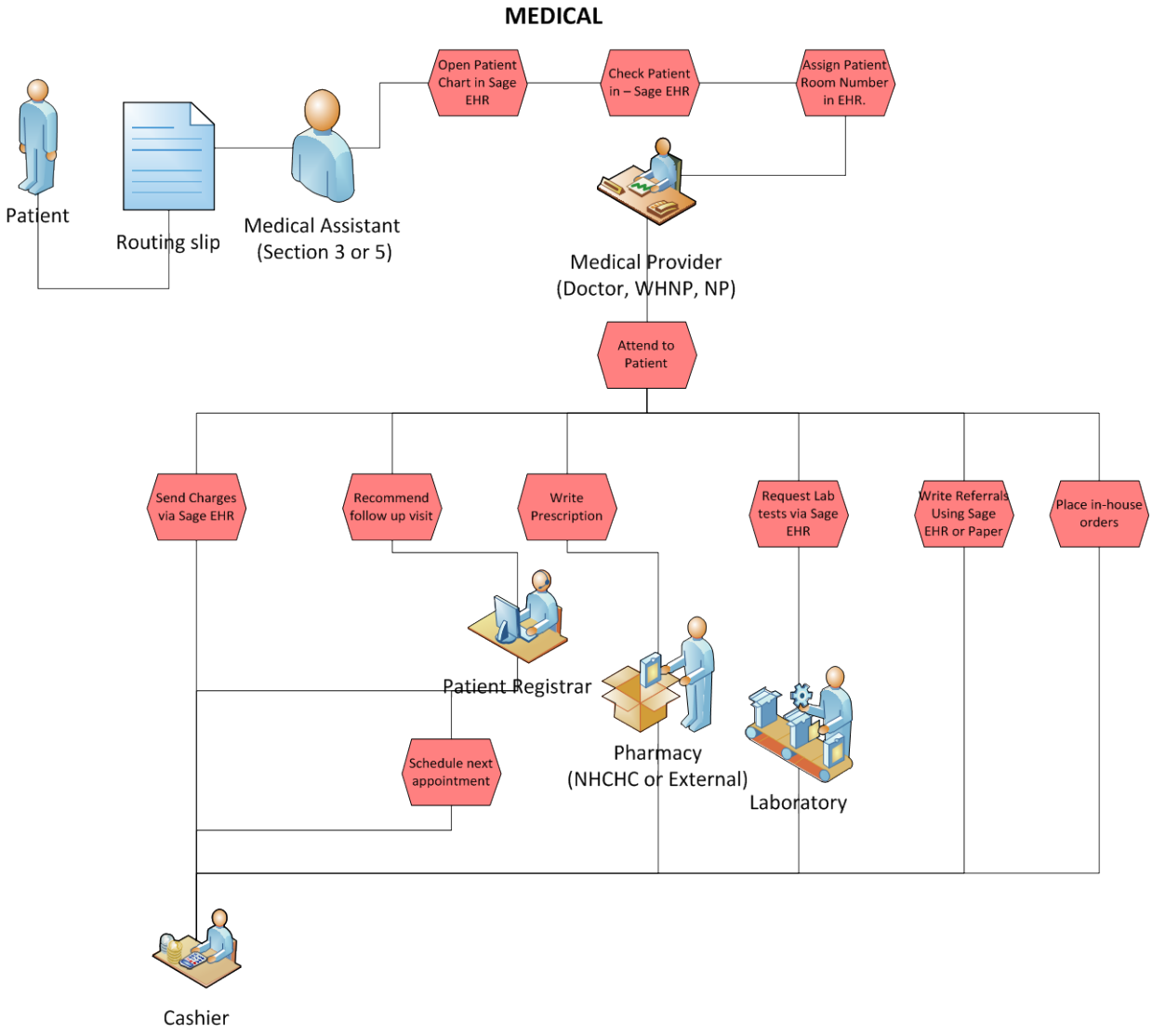


Figure 2a.

Fig 2a. MEDICAL – Business Flow Description

A. Patient receives a routing slip from Patient Registrar at check-in which they take back to see their provider either at Medical Section 3 or Medical Section 5

B. At any of the medical sections the medical assistant for designated provider receives routing slip from patient.

C. Medical Assistant opens patient chart in Sage EHR

D. Medical Assistant Checks – in patient in Sage EHR

E. Medical Assistant assigns patient to a room number where patient will be seen by medical provider.

F. Medical Provider attends to patient and provides required treatment

G. Medical Provider after seeing patient does one or more of the following;

    I. Send Charges via Sage HER. Patient then proceeds to Cashier to make payment and check out.

    II. Recommend Follow up visit: if Provider recommends a follow up visit patient goes to Patient Registrar to schedule next appointment based on Provider's availability. Patient then proceeds to cashier for payment and checkout.

    III. Write medication prescription for patient: Provider can write prescription for patient which they can pick up at the health center's local pharmacy or go to pharmacy stores outside.

    IV. Provider request laboratory tests. For tests to be conducted internally at the Health Center laboratory order is placed via Sage EHR.

V. Write Referral to Internal or External Providers. This could be done Sage EHR for internal Providers or Providers whose practice use Sage EHR system and on paper for other external providers.

H. Regardless of what happens after seeing provider every patient is still expected to meet with cashier before leaving the facility.

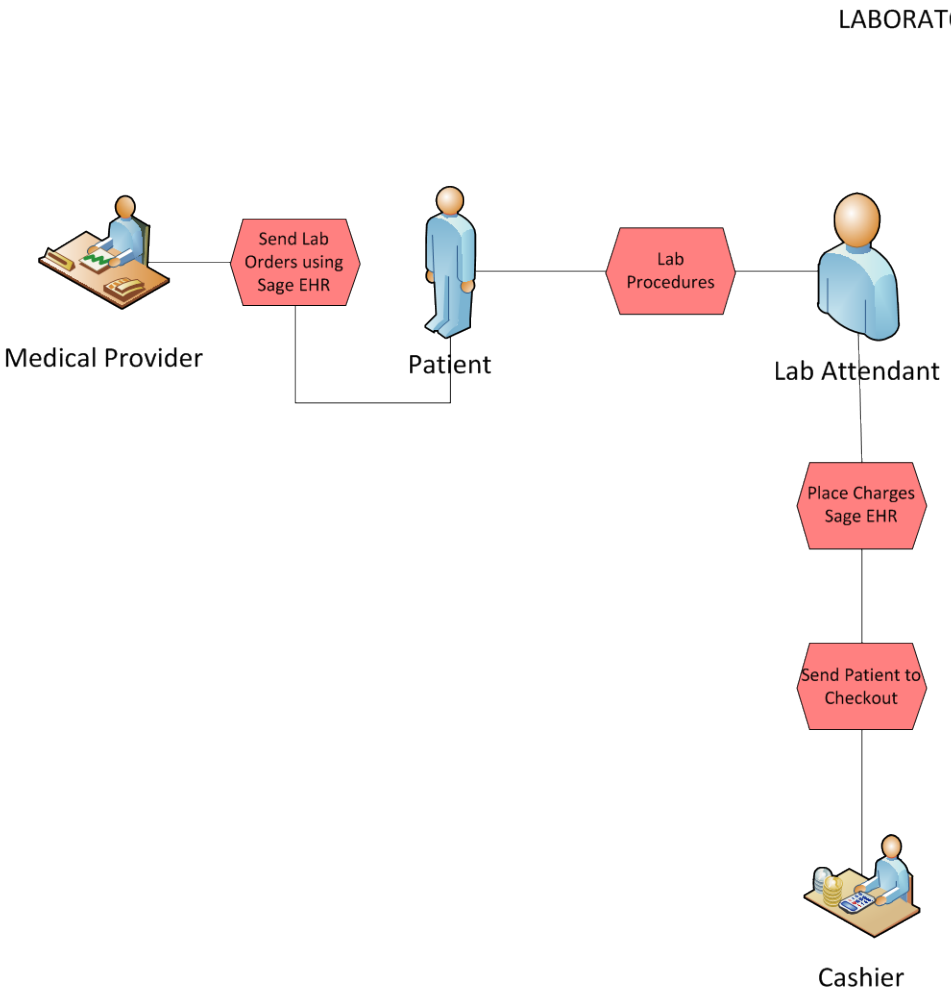


Figure 3a.

Fig 3a. LABORATORY – Business Flow Description.

I. Medical provider orders laboratory tests for patient via Sage HER

II. Patient goes to laboratory and has samples collected by Laboratory Attendant

III. Laboratory attendant places charges on Sage HER.

IV. Laboratory attendant sends patient checkout with cashier

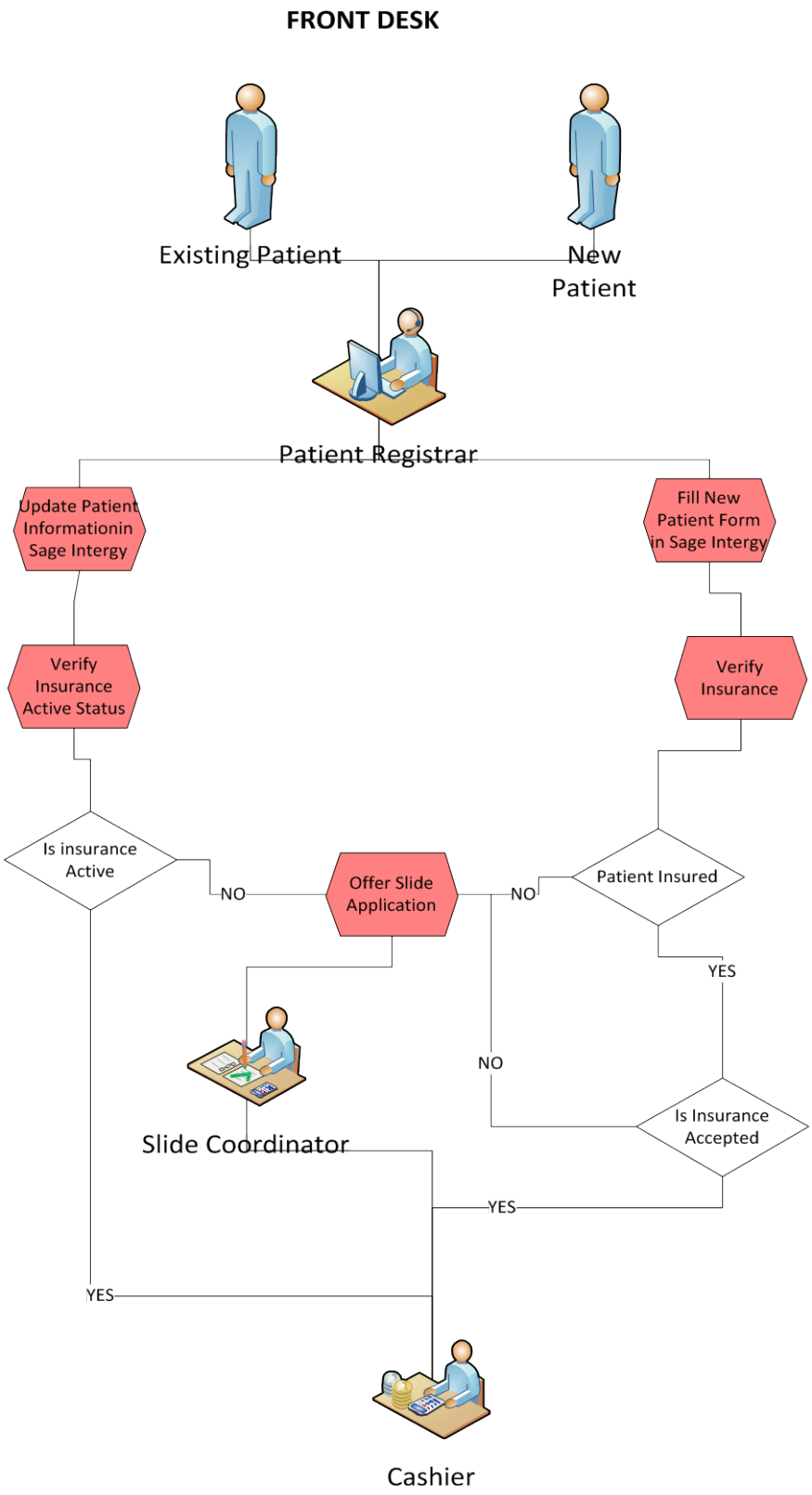

FRONT DESK
Existing Patient
New Patient
Patient Registrar
Update Patient Informationin Sage Intergy
Fill New Patient Form in Sage Intergy
Verify Insurance Active Status
Verify Insurance
Is insurance Active
NO
Offer Slide Application
NO
Patient Insured
YES
NO
Slide Coordinator
Is Insurance Accepted
YES
YES
Cashier

Figure 4a.

Fig 4a. Front Desk – Business Flow Description

a. Patient walking in could either be a new or existing patient. First stop is with Patient Registrar

   <u>New patient</u>

   I. In Sage Intergy complete new patient registration

   II. Patient Registrars request and verify patient's insurance information

   III. If patient is uninsured Patient Registrar offers them an option for slide application else Registrar verifies patient insurance to ensure patient's insurance is accepted at New Hanover Community Health Center. if yes, patient can now proceed to cashier for initial deposit

   <u>Existing Patient</u>

   I. In Sage Intergy Patient Registrars verify and update patient contact information

   II. Patient Registrar also verifies patient insurance is still active or patient slide still active.

   III. If insurance or slide is inactive Patient Registrar offers the slide application where the patient then proceeds to see slide coordinator else patient proceeds to see Cashier where initial payments are made and patient proceeds to medical or dental pending where appointment is.

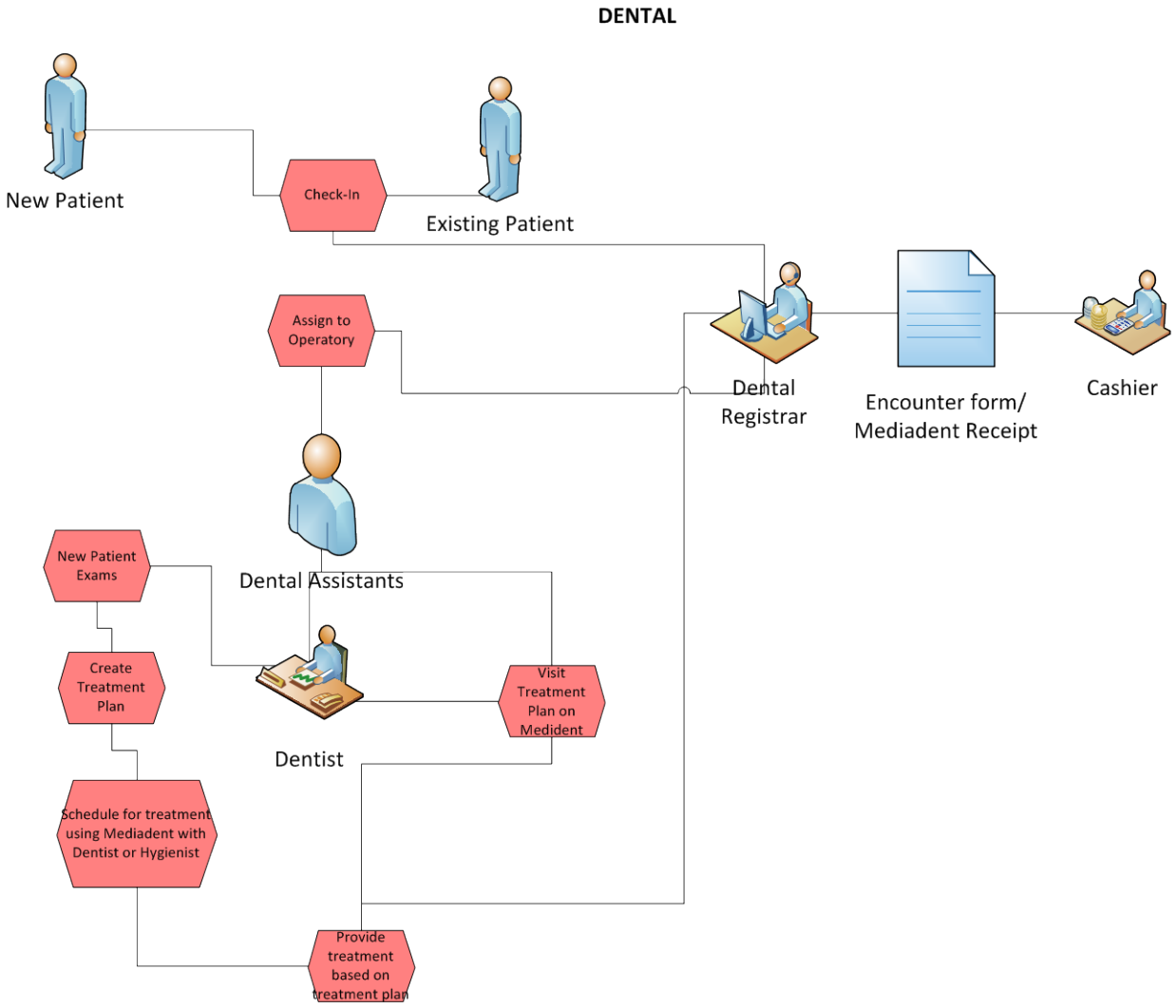


Figure 5a.

Fig 5a. DENTAL – Business Flow Description

a. Patient Registrar (dental) checks patient in using Mediadent. Patient information is pulled from Sage Intergy automatically into mediadent. Patient could new or an existing dental patient.

<u>New Patient</u>

I. Patient Registrar assigns patient to Operatory

II. Dental Assistants work with Dentist perform new patient exams

III. Dentist creates a treatment plan for new patient

IV. Next treatment is scheduled

V. After treatment patient checks out with Patient Registrar (dental).

VI. Patient is given an encounter note which patient takes to cashier. Encounter note contains details of patient's visit to the health center.

VII. After payments patient proceeds to Registrar for check out. Here Patient registrar (front desk) schedules a another appointment if patient requires it.

Existing Patient

I. Patient Registrar assigns patient to Operatory

II. Dentist/Dental Assistant/Hygienist revisits treatmentpatient treatment plan in mediadent

III. Dentist/Dental Assistant/Hygienist provide treatment based on patient treatment plan4after treatment.

IV. After treatment patient checks out with Patient Registrar (dental).

V. Patient is given an encounter note which patient takes to cashier. Encounter note contains details of patient's visit to the health center.

After payments patient proceeds to Registrar for check out. Here Patient registrar (front desk) schedules a another appointment if patient requires it.

Appendix B

Below is a representation of all systems within NHCHC and how they interact

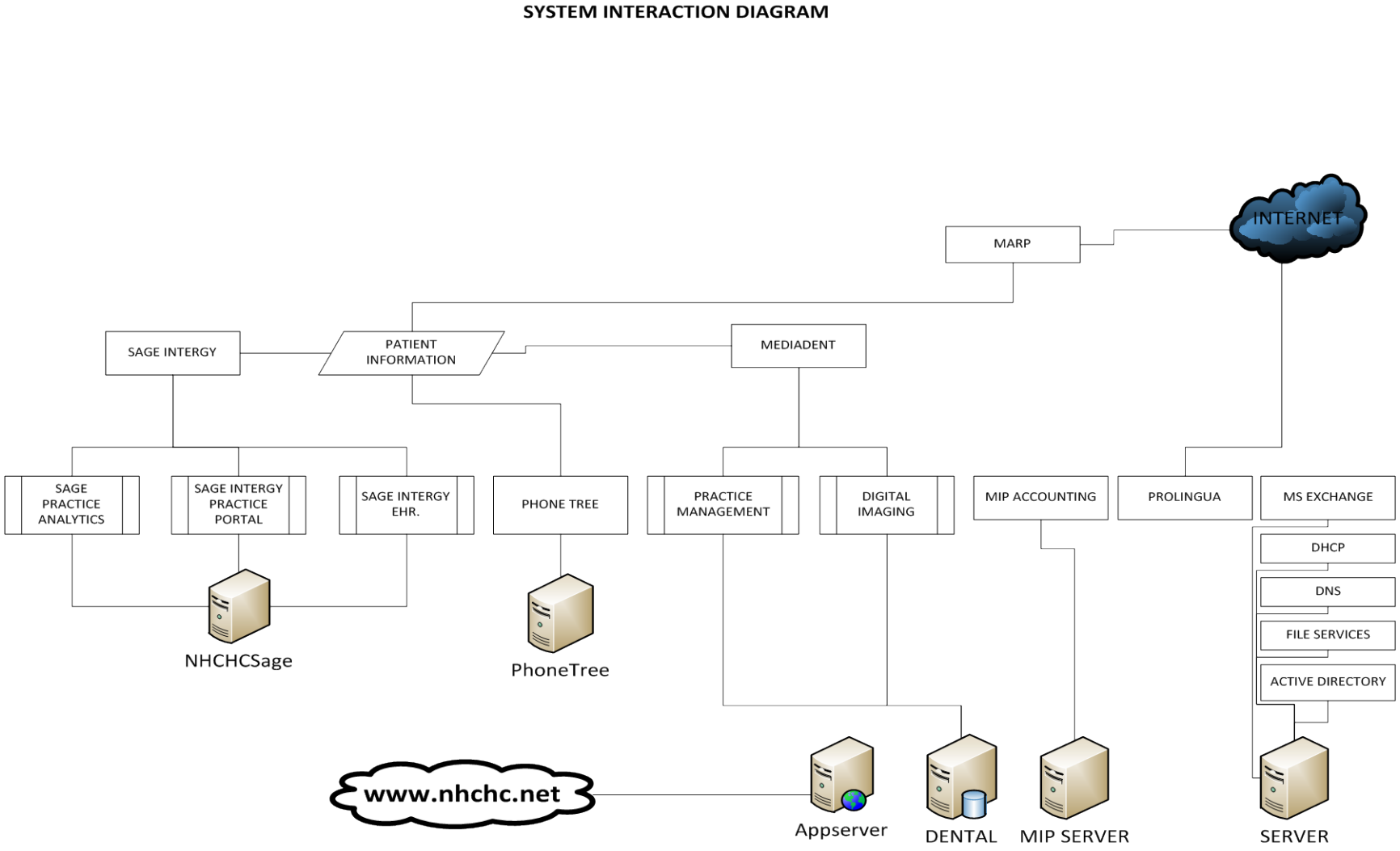


Figure 1b.

Appendix C.

Below is the present network diagram at New Hanover Community Health Center

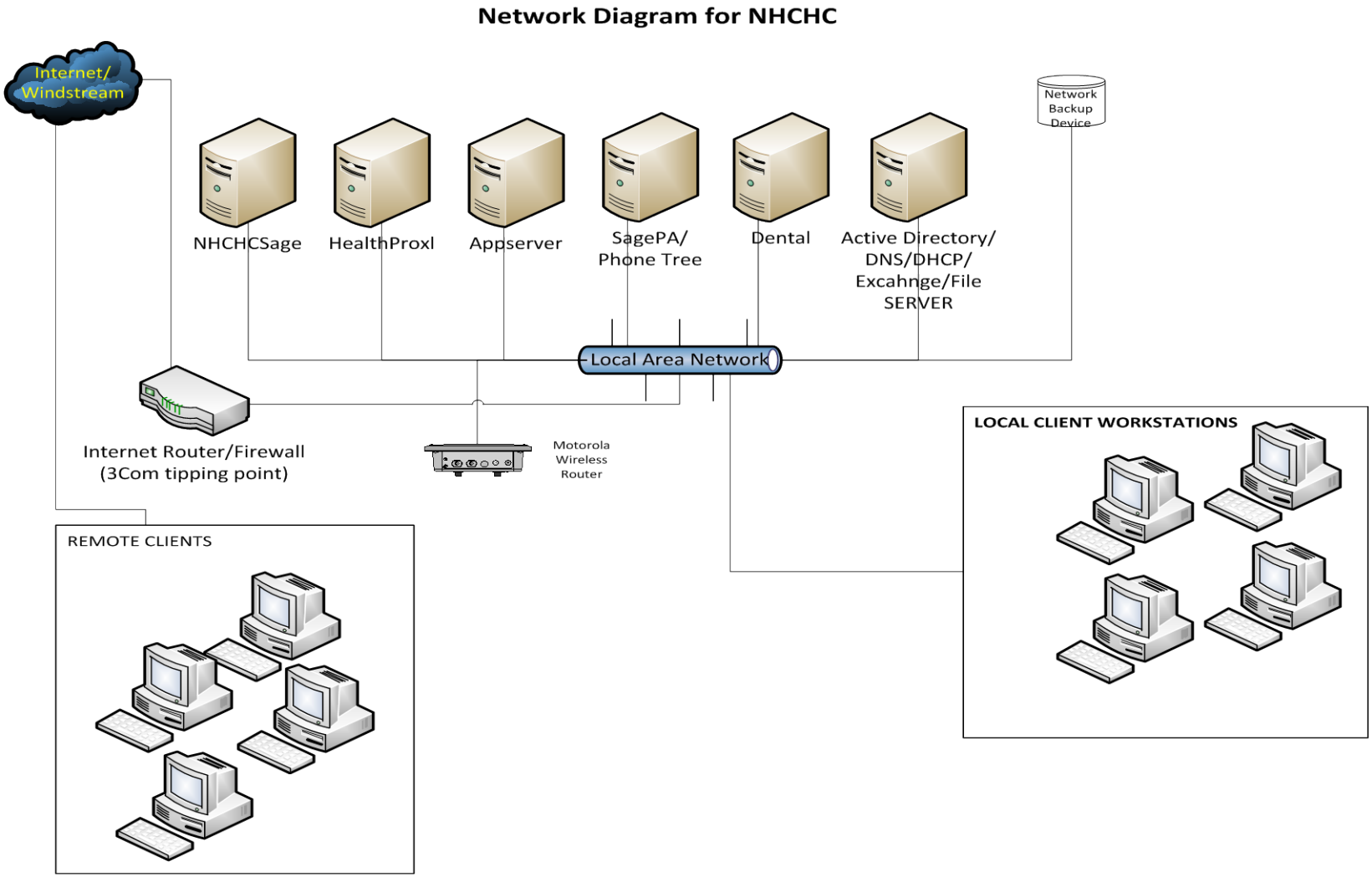


Figure 1c.

Appendix D. System Use Case Diagrams

Sage Intergy Use Cases

Figure 1d.

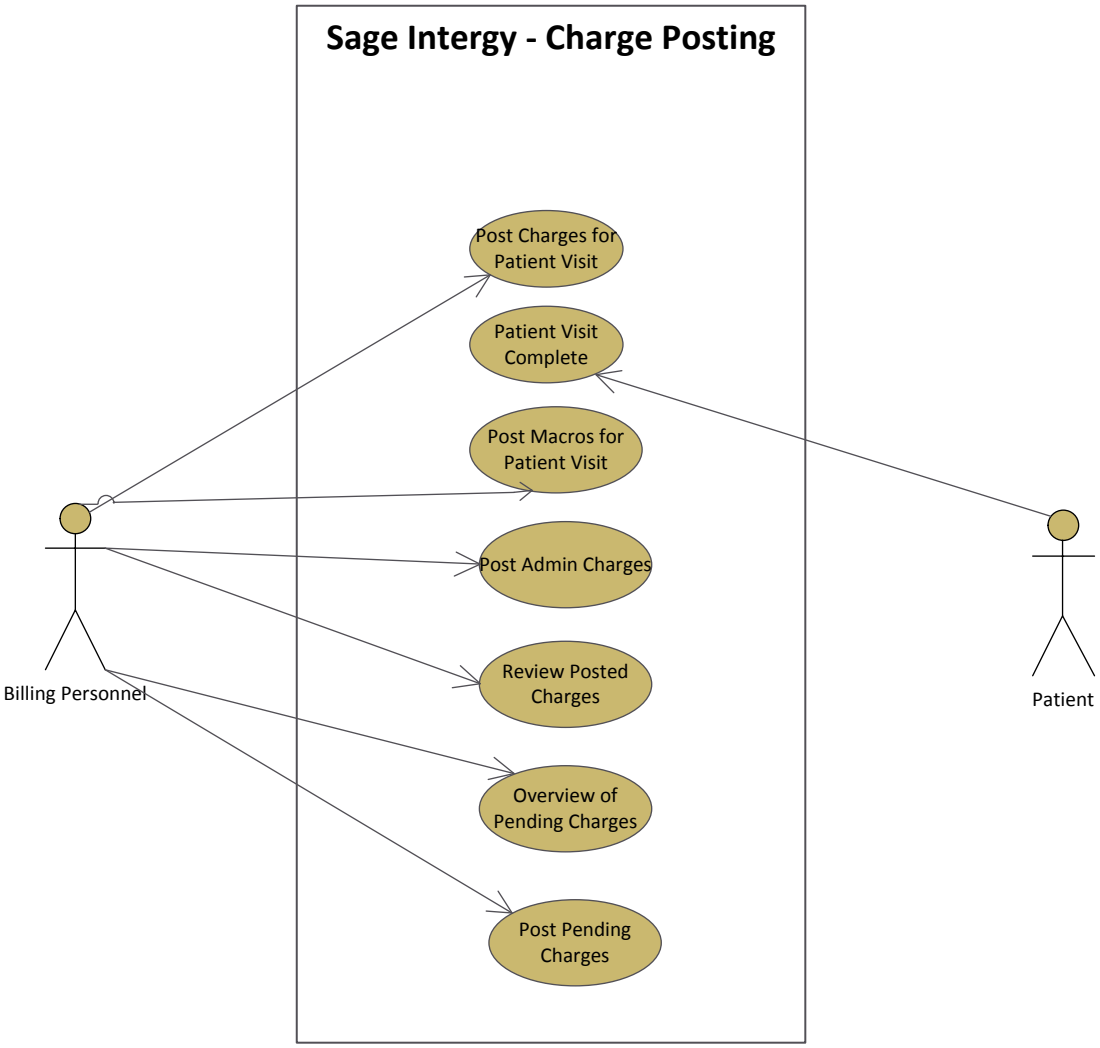

Sage Intergy - Charge Posting
Post Charges for Patient Visit
Patient Visit Complete
Post Macros for Patient Visit
Post Admin Charges
Review Posted Charges
Overview of Pending Charges
Post Pending Charges
Billing Personnel
Patient

Figure 2d.

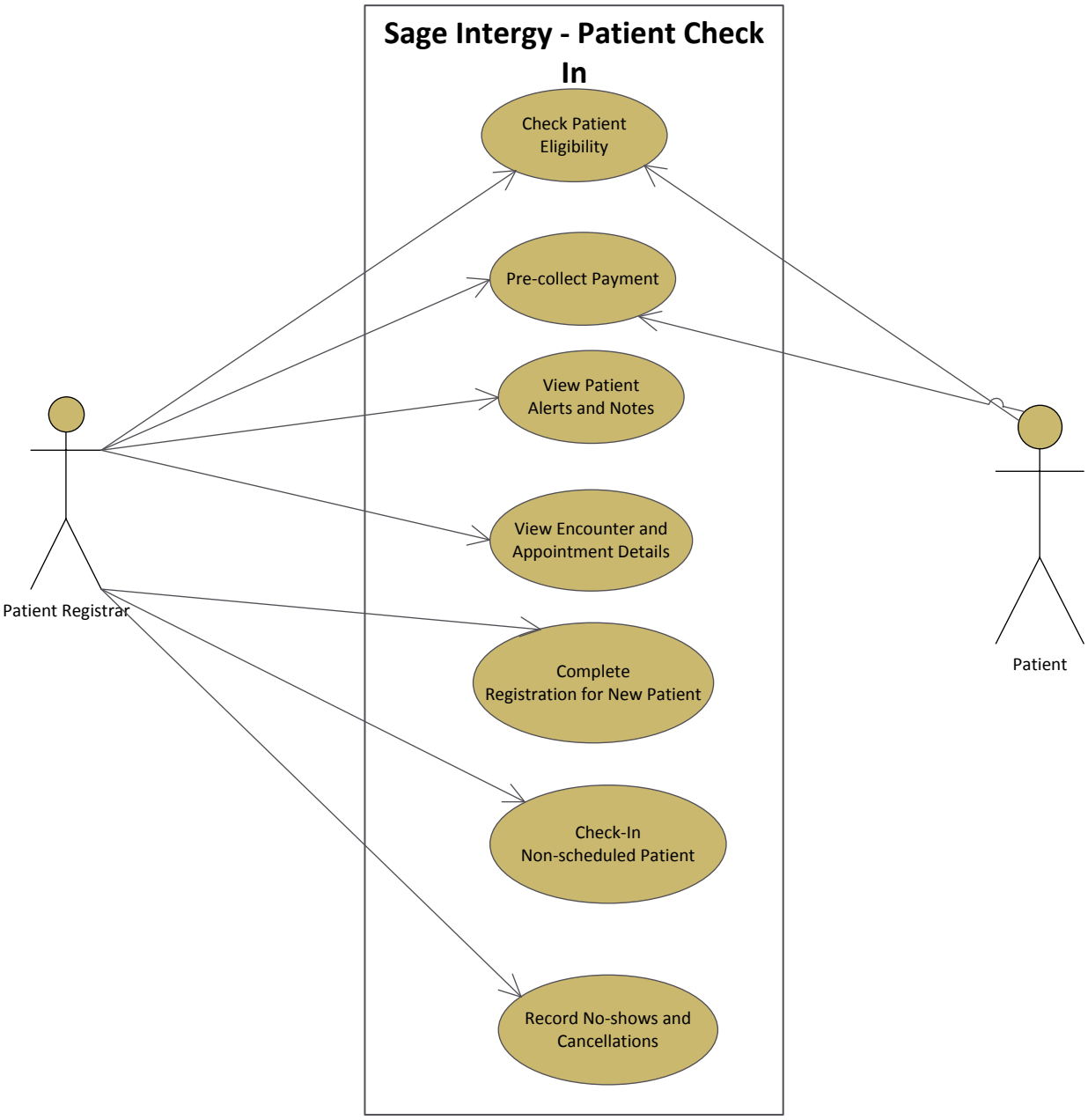

Sage Intergy - Patient Check In
Check Patient Eligibility
Pre-collect Payment
View Patient Alerts and Notes
View Encounter and Appointment Details
Complete Registration for New Patient
Check-In Non-scheduled Patient
Record No-shows and Cancellations
Patient Registrar
Patient

Figure 3d.

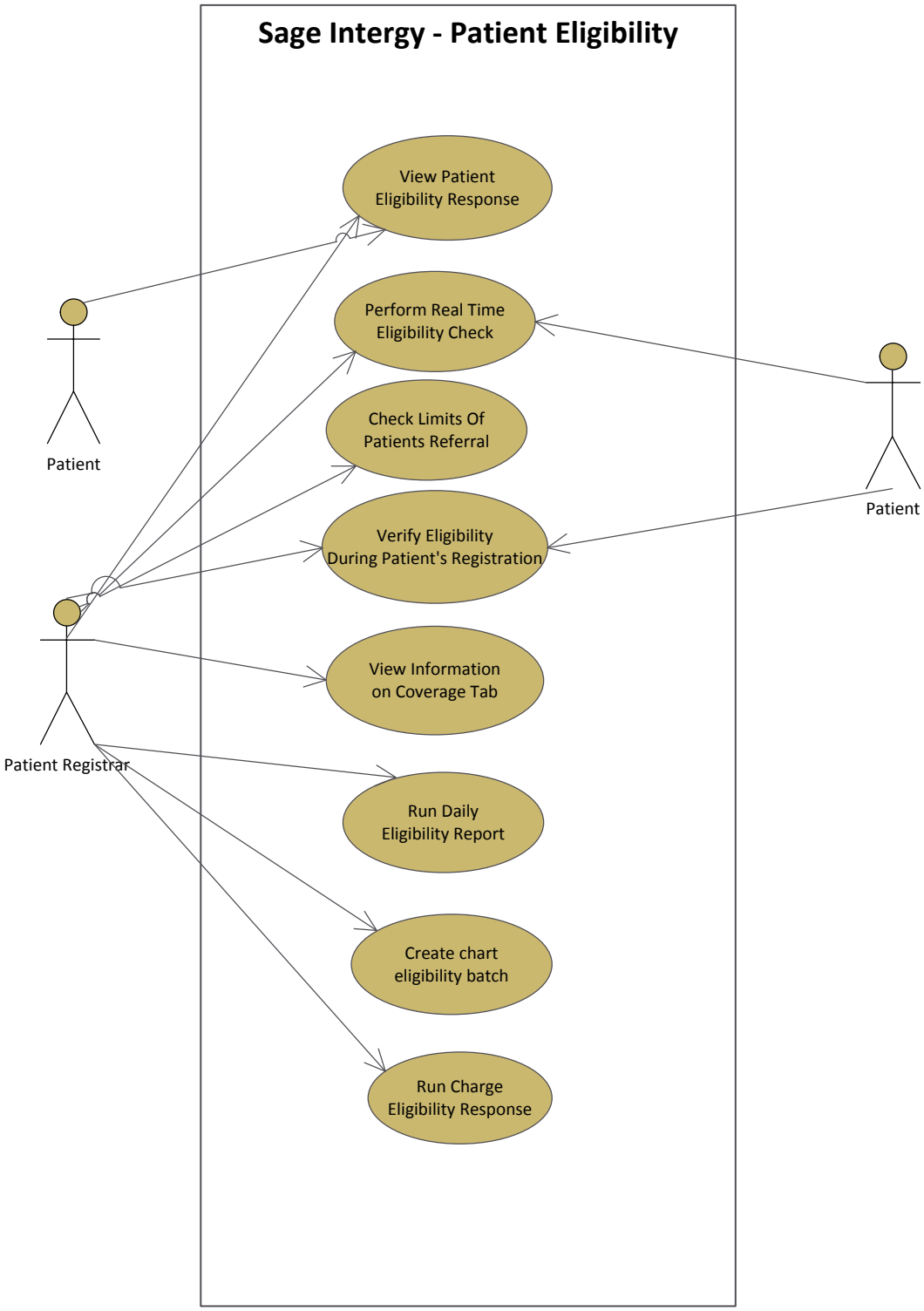

Sage Intergy - Patient Eligibility
View Patient Eligibility Response
Perform Real Time Eligibility Check
Check Limits Of Patients Referral
Verify Eligibility During Patient's Registration
View Information on Coverage Tab
Run Daily Eligibility Report
Create chart eligibility batch
Run Charge Eligibility Response
Patient
Patient
Patient Registrar

Figure 4d.


Patient Flow Tracking
Set View Options
Record Patient Flow Tracking Event
Checking In Walk-In Patients
Check Patient Eligibility
Complete Registration for New Patient
Record No-shows and Cancellations
Pre-collect Payment
View Alerts and Notes
View Encounter and Appointment Details
Run Patient Flow Analysis Report
Patient Registrar
Patient
Cashier
Provider
Medical Assistant

Figure 5d.

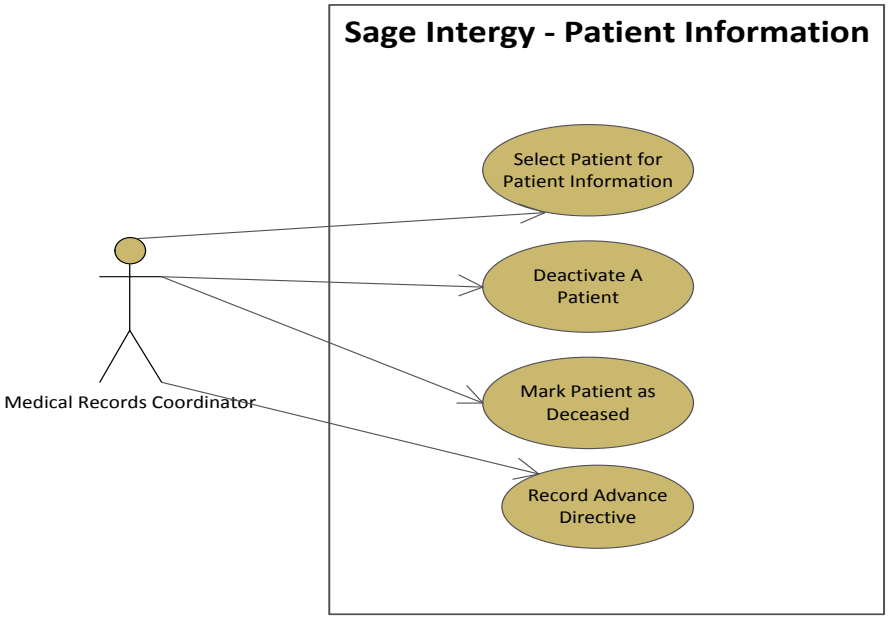


Figure 6d.

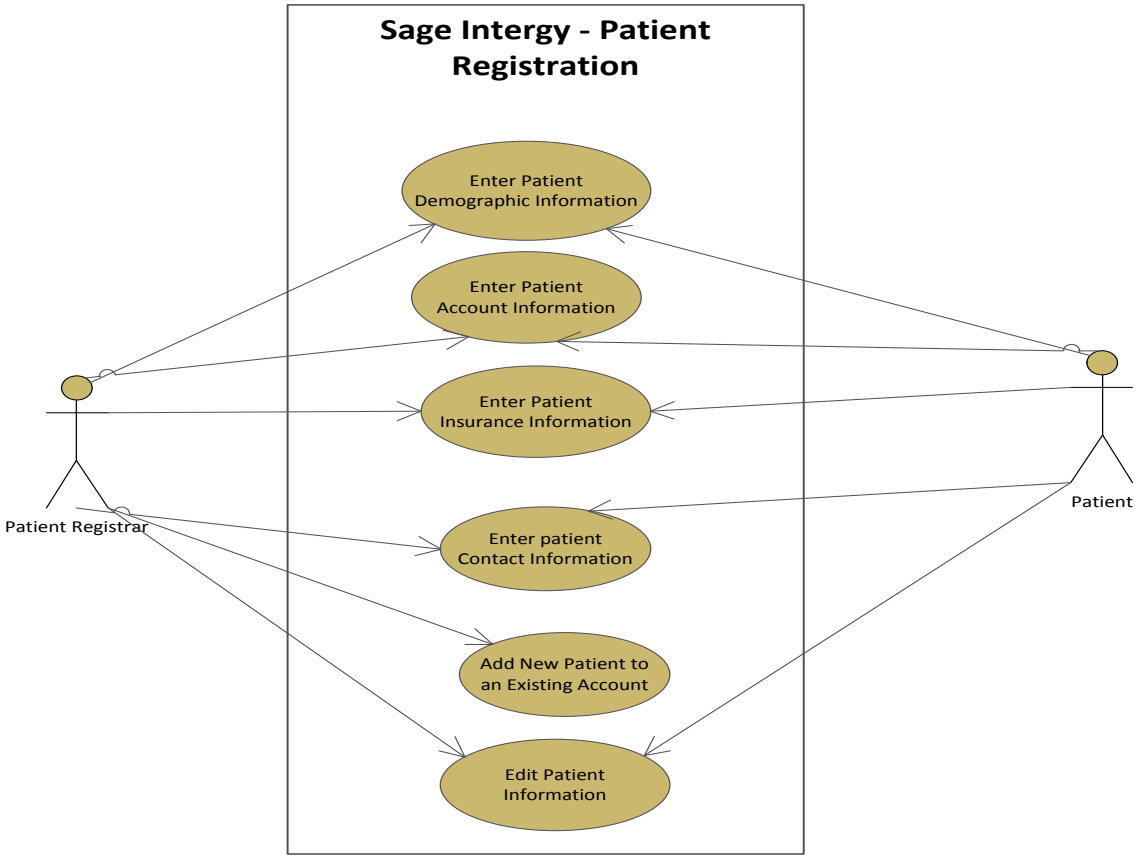

Sage Intergy - Patient Registration
Enter Patient Demographic Information
Enter Patient Account Information
Enter Patient Insurance Information
Enter patient Contact Information
Add New Patient to an Existing Account
Edit Patient Information
Patient Registrar
Patient

Figure 7d.

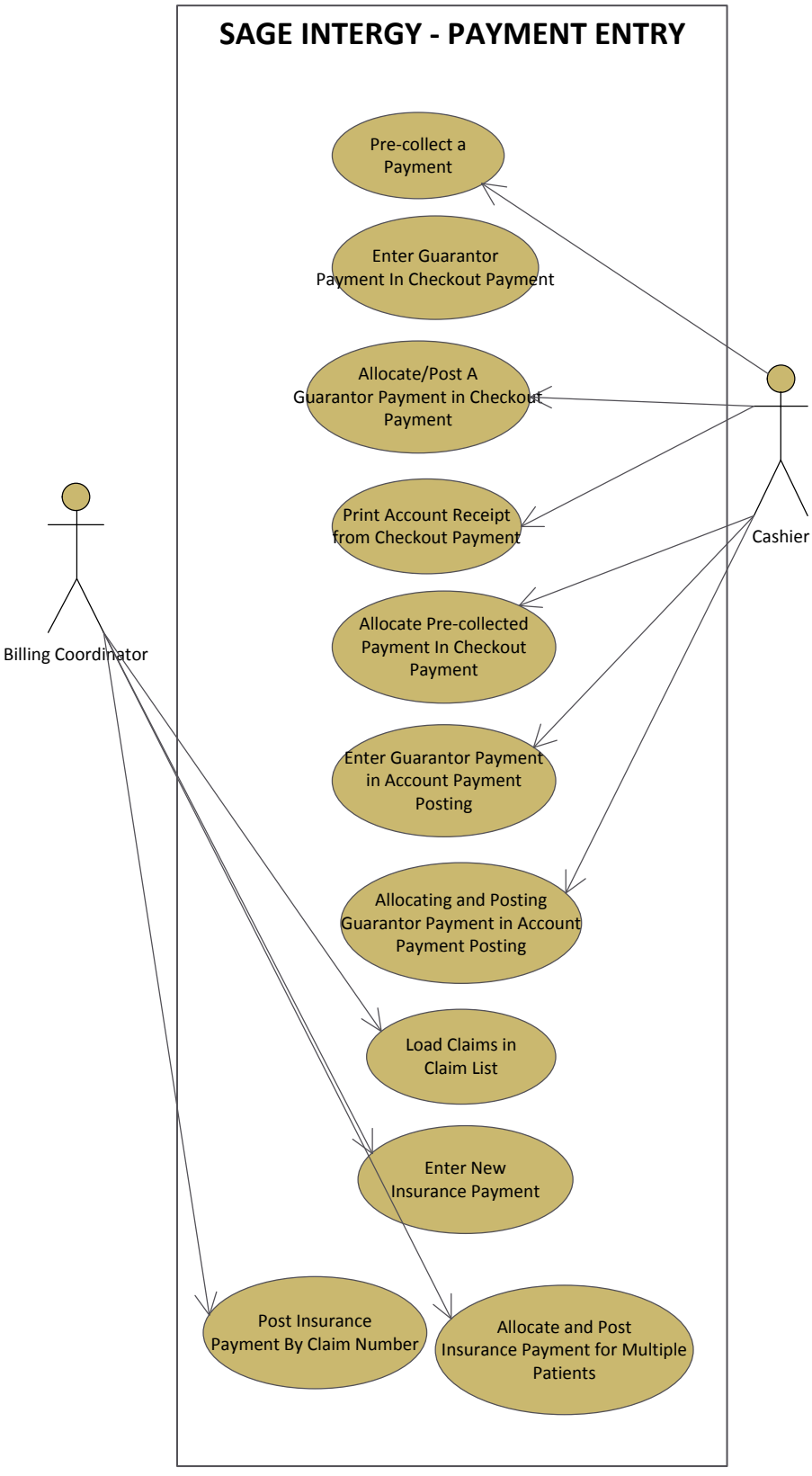

SAGE INTERGY - PAYMENT ENTRY
Pre-collect a Payment
Enter Guarantor Payment In Checkout Payment
Allocate/Post A Guarantor Payment in Checkout Payment
Print Account Receipt from Checkout Payment
Allocate Pre-collected Payment In Checkout Payment
Enter Guarantor Payment in Account Payment Posting
Allocating and Posting Guarantor Payment in Account Payment Posting
Load Claims in Claim List
Enter New Insurance Payment
Post Insurance Payment By Claim Number
Allocate and Post Insurance Payment for Multiple Patients
Billing Coordinator
Cashier

Figure 8d.

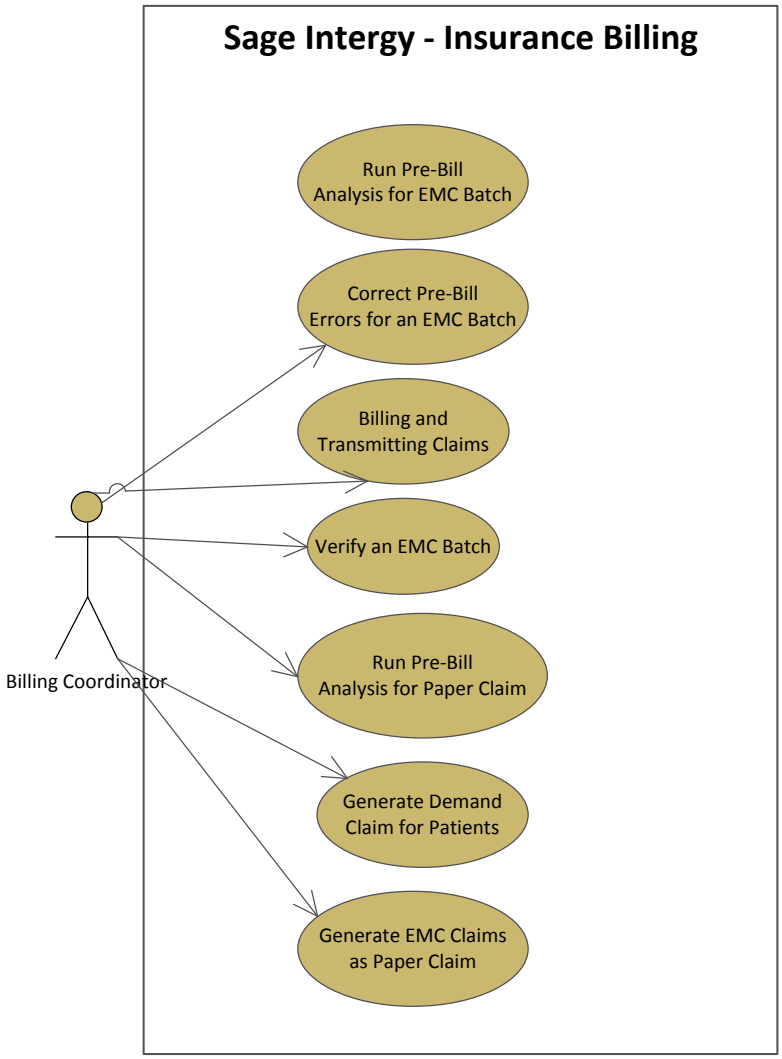

Sage Intergy - Insurance Billing
Run Pre-Bill Analysis for EMC Batch
Correct Pre-Bill Errors for an EMC Batch
Billing and Transmitting Claims
Verify an EMC Batch
Run Pre-Bill Analysis for Paper Claim
Generate Demand Claim for Patients
Generate EMC Claims as Paper Claim
Billing Coordinator

Figure 9d.

Sage EHR Use Cases.

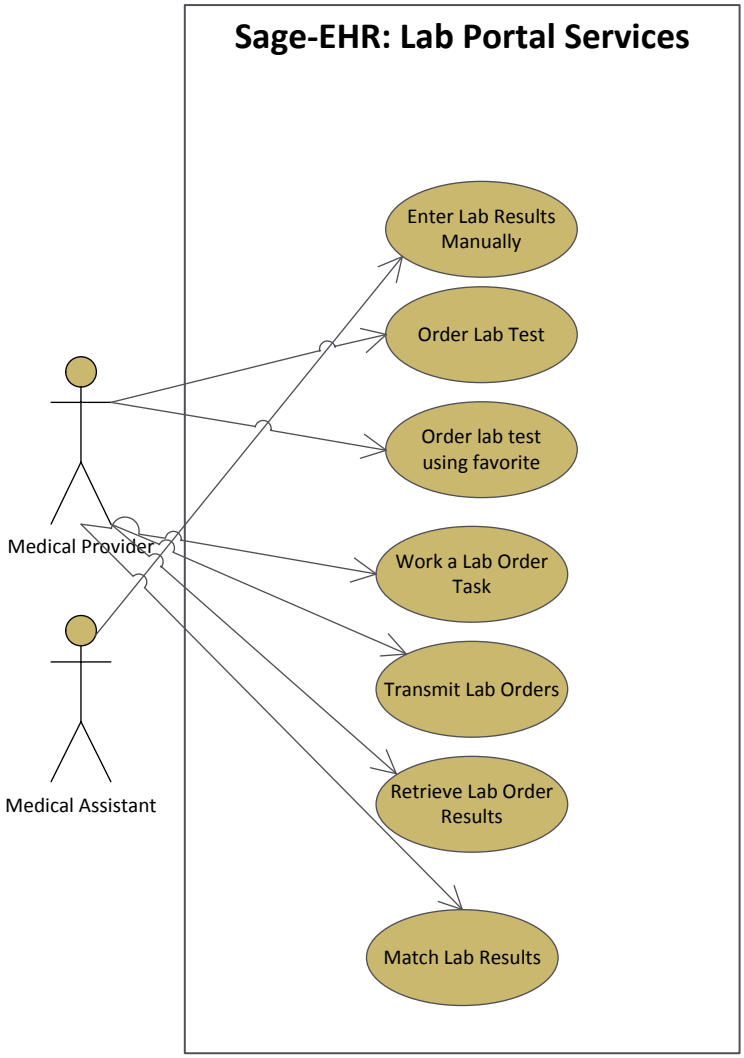


Figure 10d.

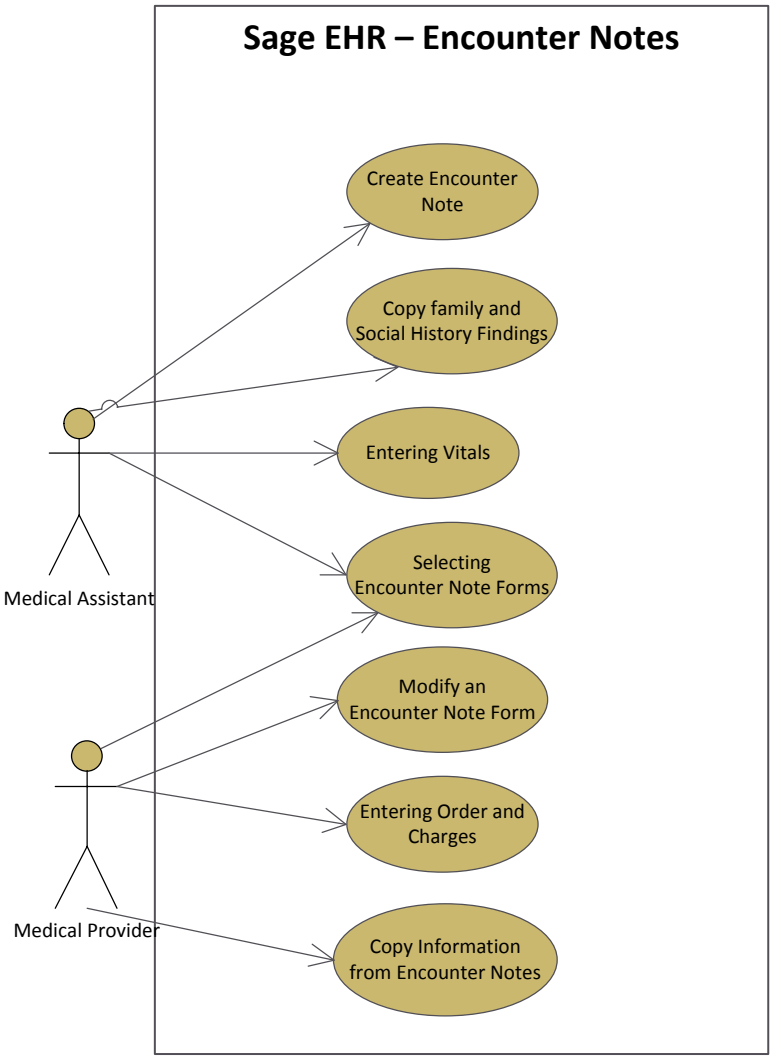

Sage EHR – Encounter Notes
Create Encounter Note
Copy family and Social History Findings
Entering Vitals
Selecting Encounter Note Forms
Modify an Encounter Note Form
Entering Order and Charges
Copy Information from Encounter Notes
Medical Assistant
Medical Provider

Figure 11d.

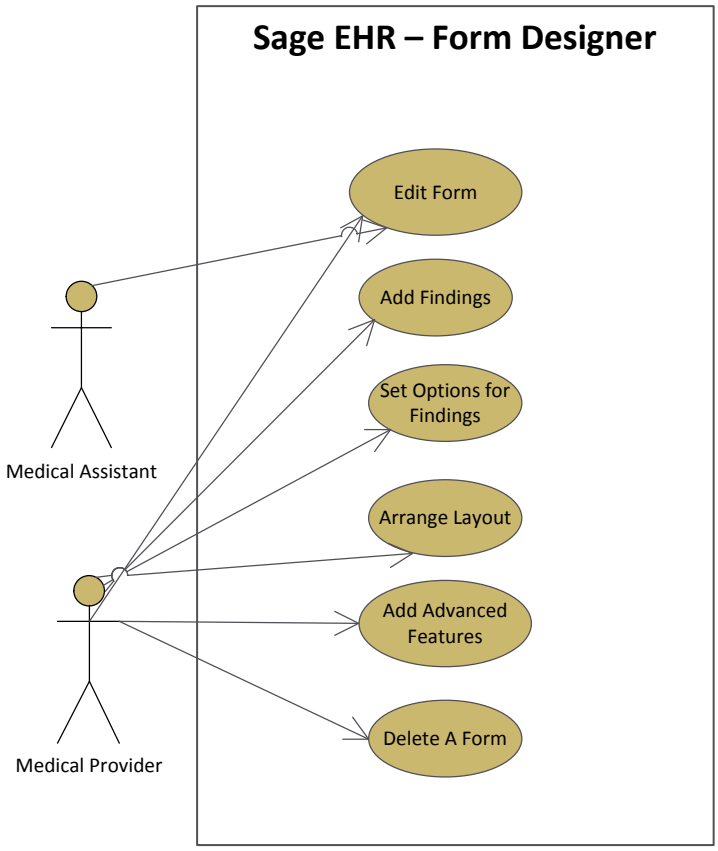

Sage EHR – Form Designer
Edit Form
Add Findings
Set Options for Findings
Arrange Layout
Add Advanced Features
Delete A Form
Medical Assistant
Medical Provider

Figure 12d.

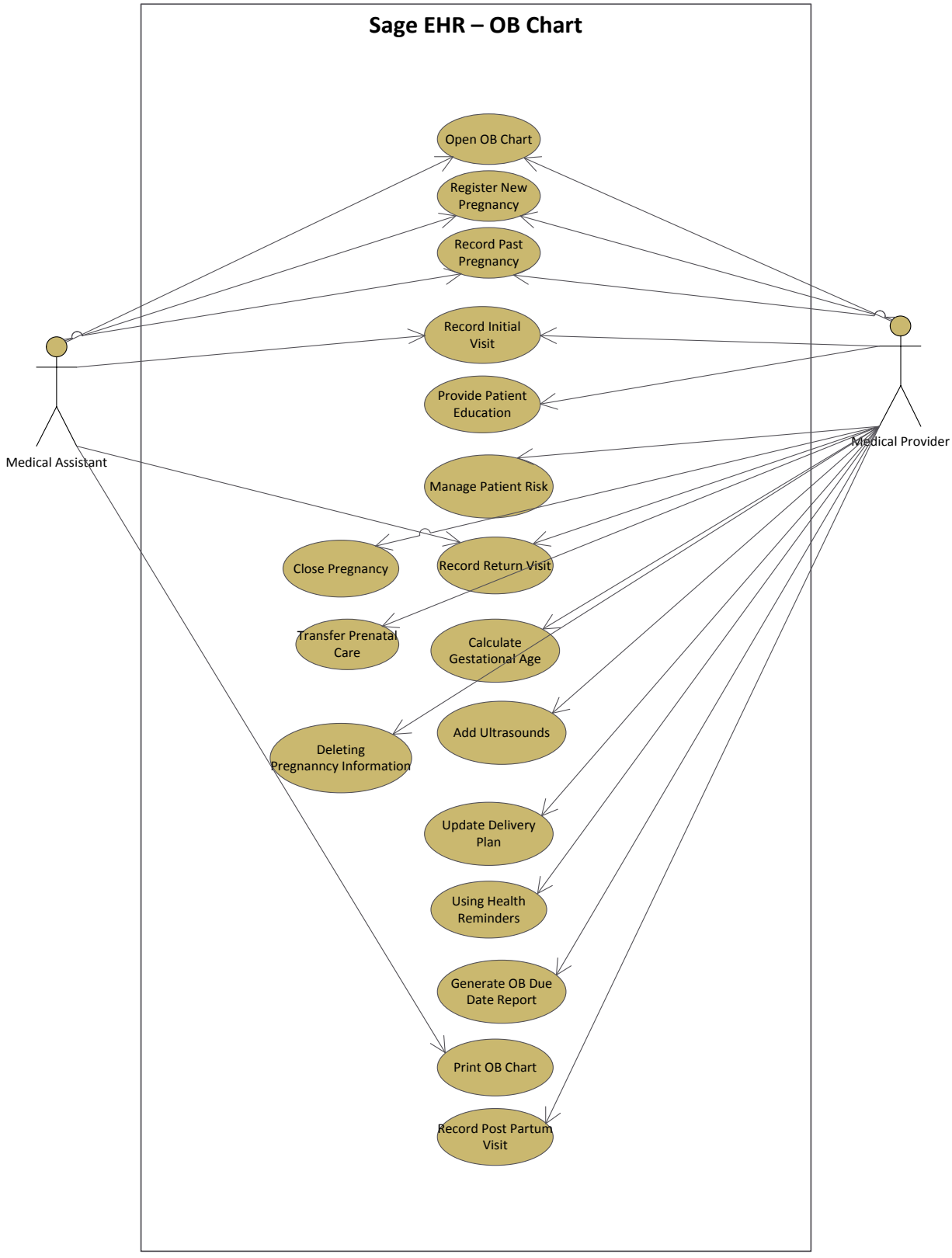

Sage EHR – OB Chart
Open OB Chart
Register New Pregnancy
Record Past Pregnancy
Record Initial Visit
Provide Patient Education
Manage Patient Risk
Close Pregnancy
Record Return Visit
Transfer Prenatal Care
Calculate Gestational Age
Add Ultrasounds
Deleting Pregnanncy Information
Update Delivery Plan
Using Health Reminders
Generate OB Due Date Report
Print OB Chart
Record Post Partum Visit
Medical Assistant
Medical Provider

Figure 13d.

Sage Practice Portal Use Case Diagram

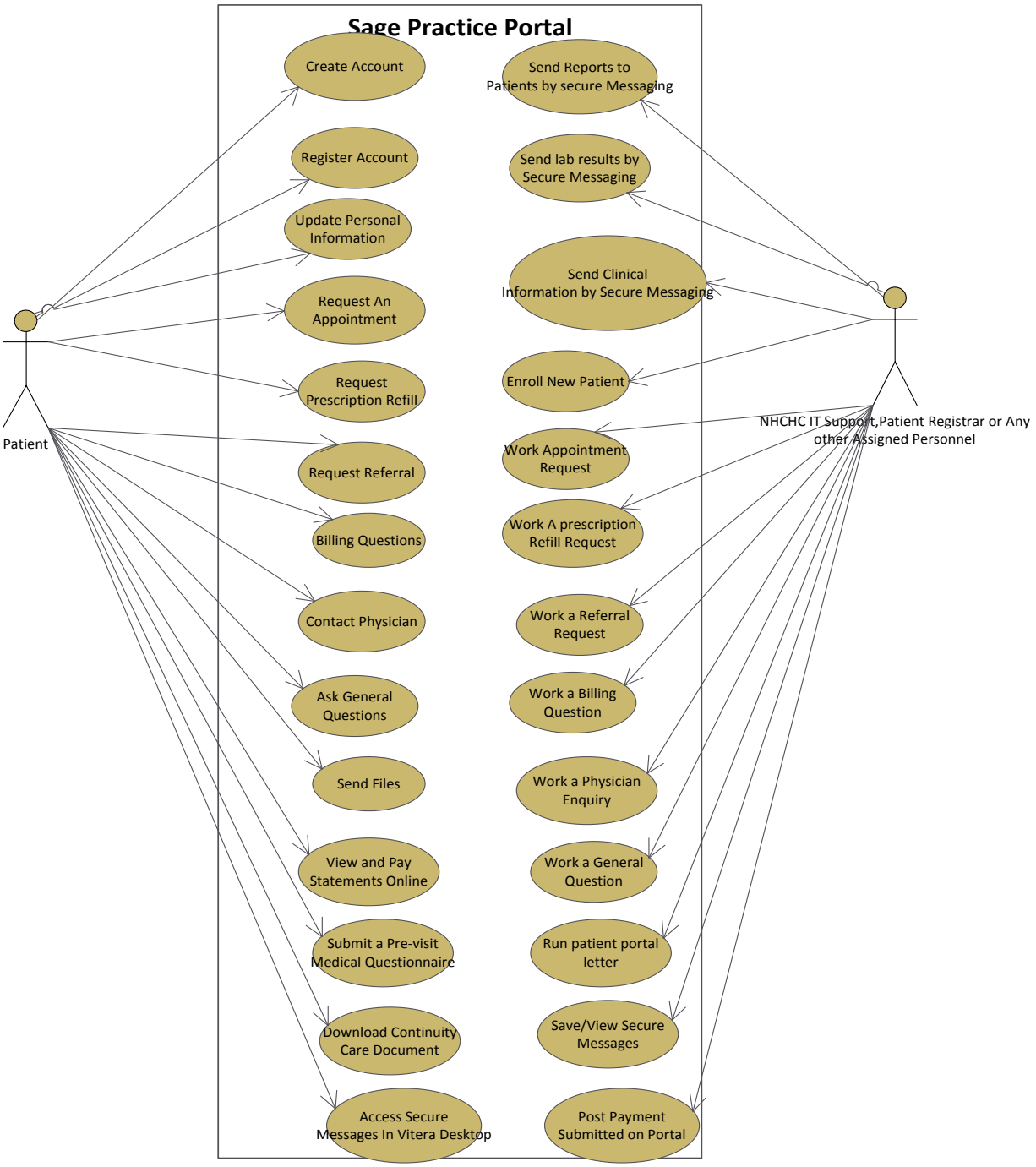


Figure 14d.

Sage Practice Analytics Use Cases

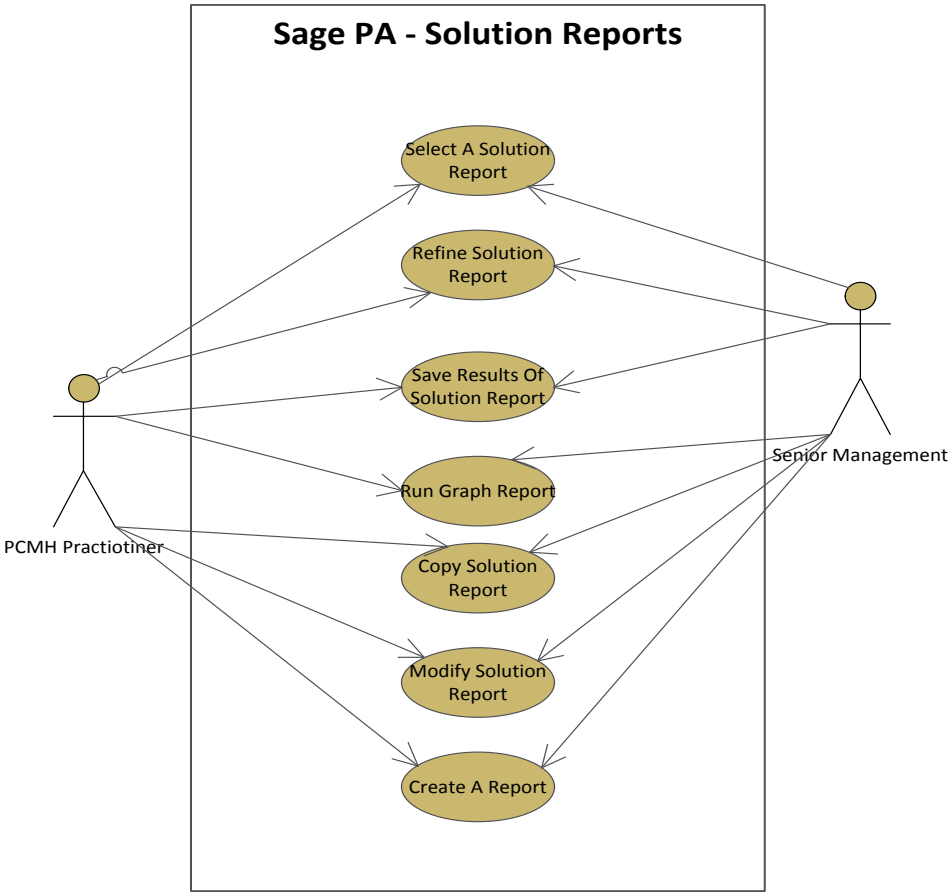


Figure 15d.

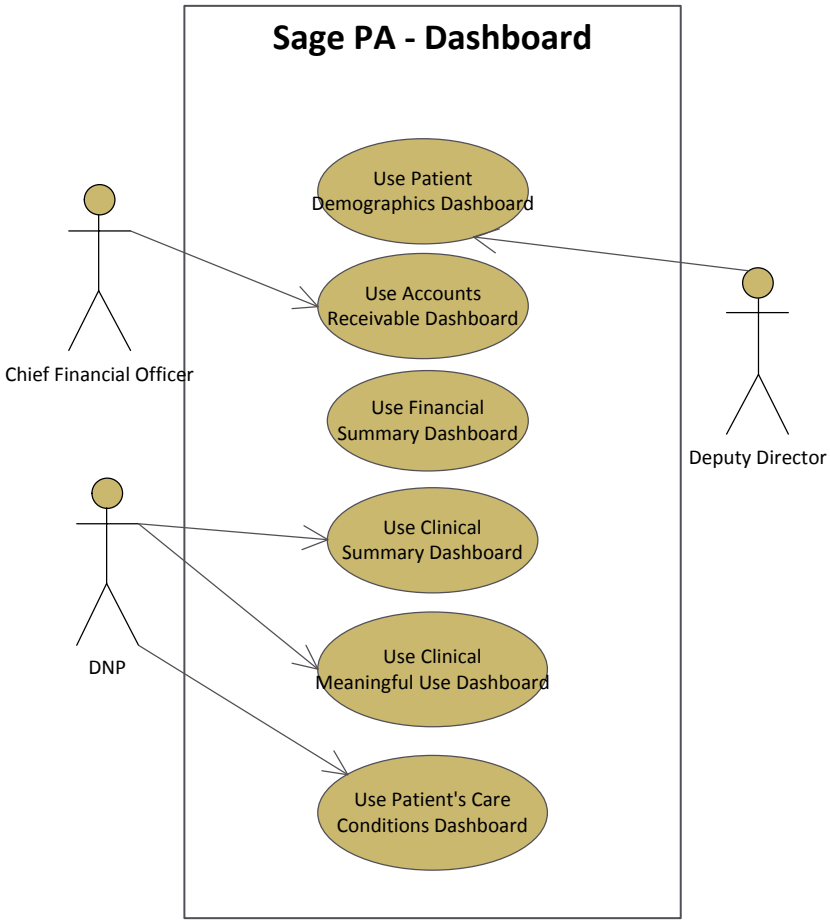

Sage PA - Dashboard
Use Patient Demographics Dashboard
Use Accounts Receivable Dashboard
Use Financial Summary Dashboard
Use Clinical Summary Dashboard
Use Clinical Meaningful Use Dashboard
Use Patient's Care Conditions Dashboard
Chief Financial Officer
DNP
Deputy Director

Figure 16d.

MIP Accounting Use Cases

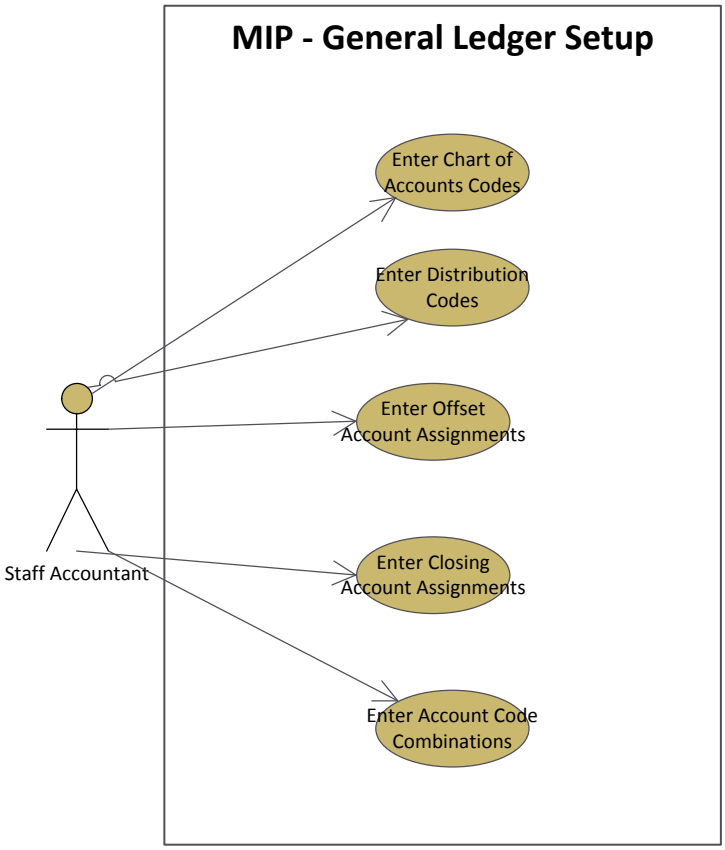


Figure 17d.

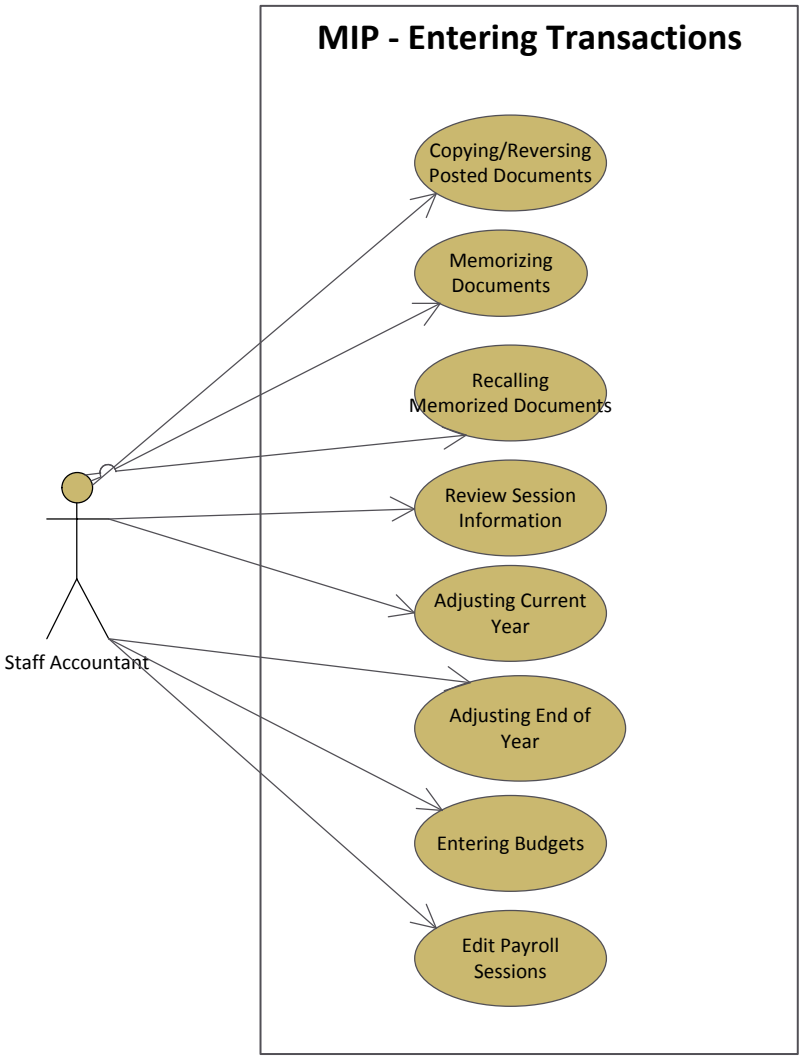

MIP - Entering Transactions
Copying/Reversing Posted Documents
Memorizing Documents
Recalling Memorized Documents
Review Session Information
Adjusting Current Year
Adjusting End of Year
Entering Budgets
Edit Payroll Sessions
Staff Accountant

Figure 18d.

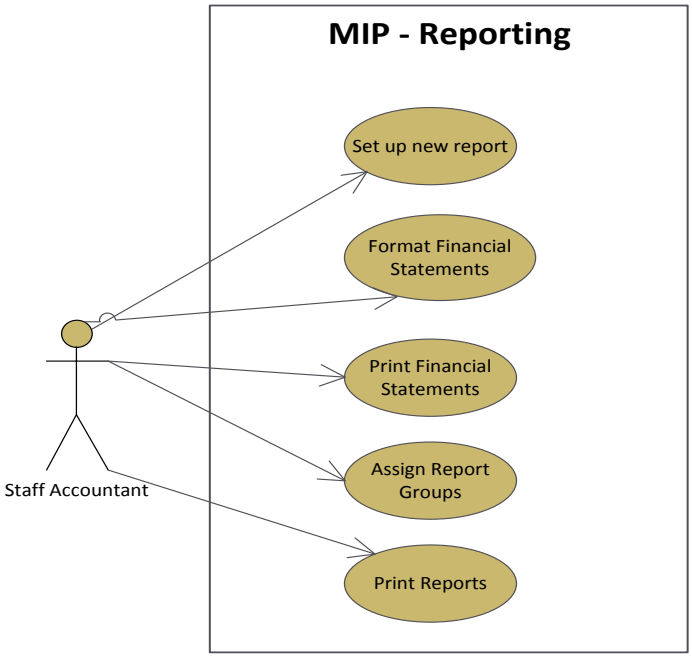


Figure 19d.

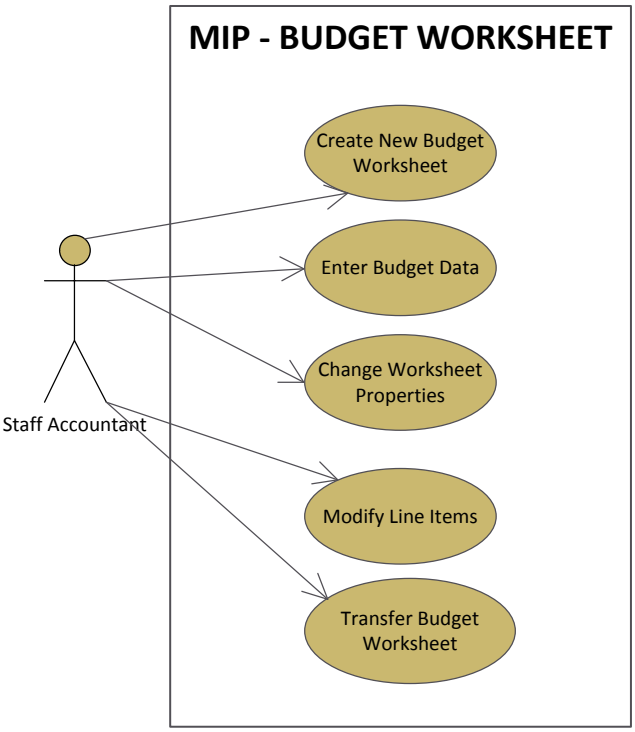


Figure 20d.

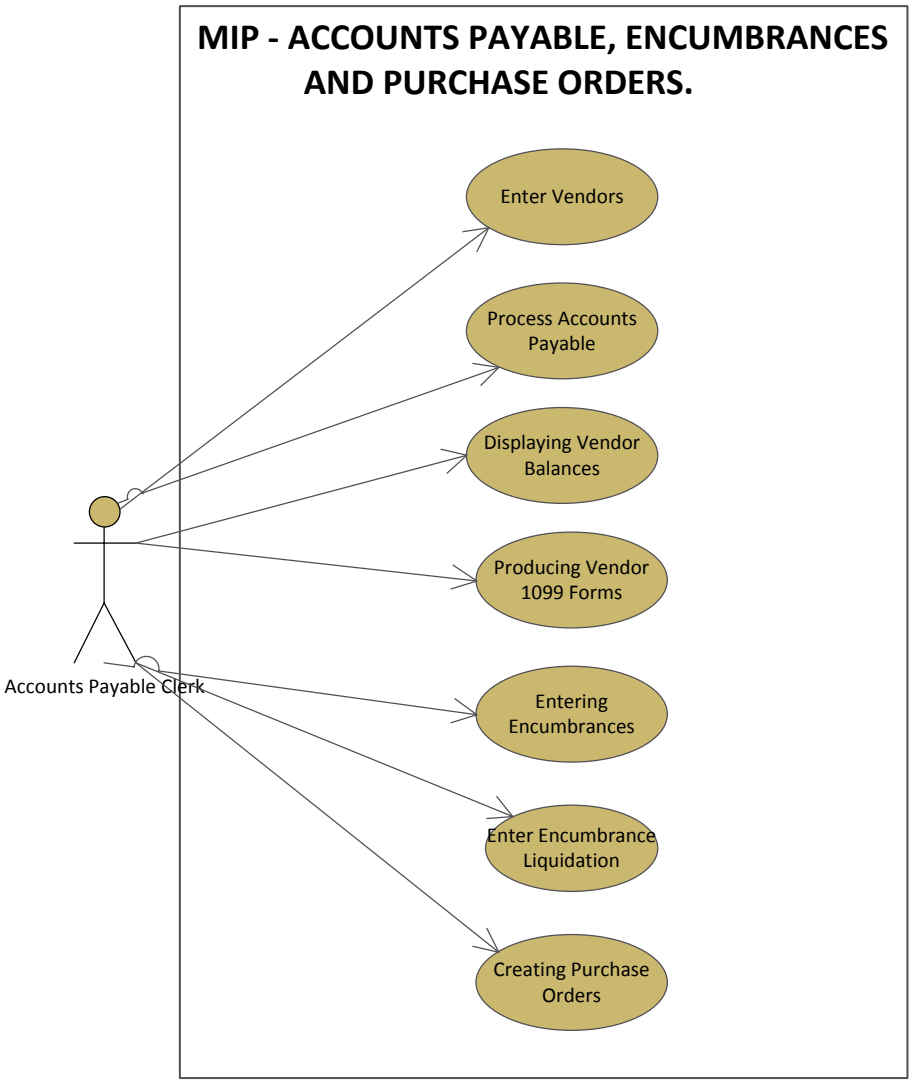

MIP - ACCOUNTS PAYABLE, ENCUMBRANCES AND PURCHASE ORDERS.
Enter Vendors
Process Accounts Payable
Displaying Vendor Balances
Producing Vendor 1099 Forms
Entering Encumbrances
Enter Encumbrance Liquidation
Creating Purchase Orders
Accounts Payable Clerk

Figure 21d.

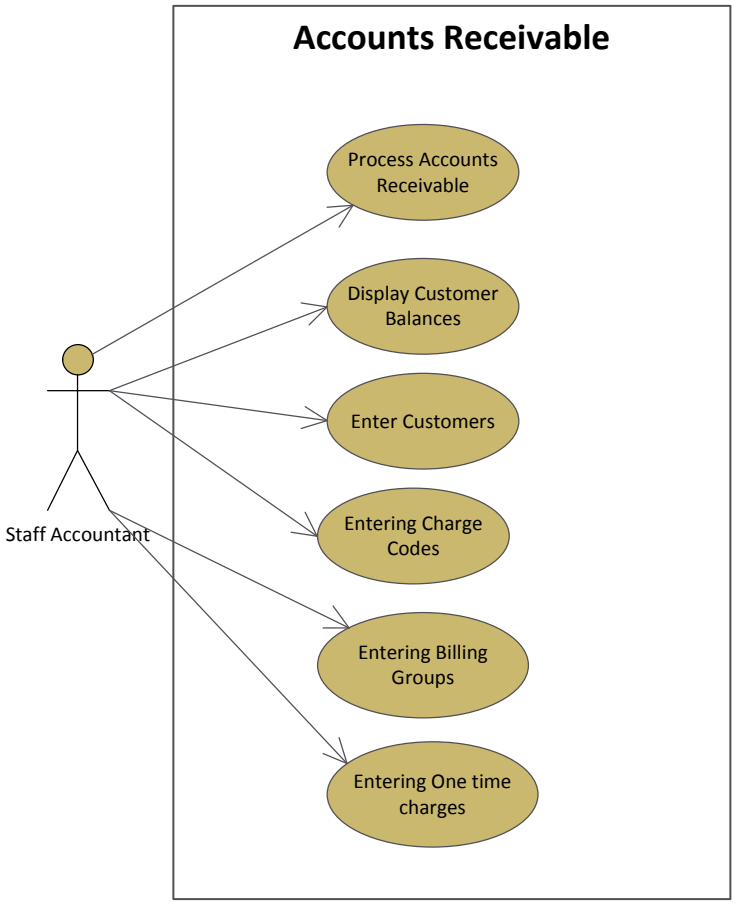

Accounts Receivable
Process Accounts Receivable
Display Customer Balances
Enter Customers
Entering Charge Codes
Entering Billing Groups
Entering One time charges
Staff Accountant

Figure 22d.

APPENDIX E.

IT Inventory at NHCHC

Location/Office	**Department**	**Type**	**Brand**	**Model**	**Date Put In Service**	**Notes**	Updated By 1/24/2012		
Copier Room	Copier Room	All in One	XEROX	XEROX 5050		Double-side network scanner			
Dianne Hayes	Billing Coordinator	All in One	HP	Laser Jet 3050					
Font Desk	Font Desk	All in One	XEROX	XEROX Work Center 5030					
Opposite to Dianne's Office	Opposite to Dianne's Office	All in One	HP	Laser Jet 3050					
Pharmacy	Pharmacy	All in One	Cannon	Super G3					

Roxanna	MA	All in One	HP	Laserjet 3055					
Section 1	Dental MA	All in One	Canon	ImageCLASS MF4370DN		Printer, Copier, Scanner & Super G3 Fax			
Alfred Thomas	CEO	Desktop	Dell	OPTI PLEX 760					
Althea Johnson	Deputy Director	Desktop	Dell	OPTIPLEX 755					
Amy Howard	Medical Record	Desktop	Dell	OPTI PLEX 760					
Avery Acosta	Collection	Desktop	Dell	OPTIPLEX 760					
Carla Savinon	MD	Desktop	Dell	OPTIPLEX 760					
Carla	MD	Desktop	HP	Dimension					

Savinon's office				3000					
Conference Room	Conference Room	Desktop	Dell	Dimension 3000					
Darcie	MD	Desktop	Dell	OPTIPLEX 760					
Dianne Hayes	Billing Coordinator	Desktop	Dell	OPTIPLEX 760					
Douglas DeGroote	Dental	Desktop	Dell	OPTIPLEX 760					
Erin Williamson	MD	Desktop	Dell	OPTIPLEX 760					
Font Desk	Font Desk	Desktop	Dell	Dell OPTI PLEX T68					
Font Desk	Font Desk	Desktop	Dell	Dell OPTI					

				PLEX T68					
Font Desk	Font Desk	Desktop	Dell	Dell OPTI PLEX T68					
Font Desk	Font Desk	Desktop	Dell	Dell OPTI PLEX T68					
Francine Andrews	Administat or Assistant	Desktop	Dell	OPTIPLEX 755					
Francine Andrews	Human Resources	Desktop	Dell	OPTIPLEX 760					
Francine Andrews	Human Resources	Desktop	Dell	Dimension 2400					
Francine Andrews	Human Resources	Desktop	Dell	OPTIPLEX ax110					
Guoying Burgess	Accountant	Desktop	Dell	OPTIPLEX 760					

Irvin	MD	Desktop	Dell	OPTIPLEX 760					
John Ficht		Desktop	Dell	OPTI PLEX 760					
La'Shann Young	Lab	Desktop	Dell	OPTIPLEX 760					
Marshelle Powell	MD	Desktop	Dell						
Mary Hopkins	Account Payable	Desktop	Dell	OPTIPLEX 760					
Medical Record	Medical Record	Desktop	Dell	OPTI PLEX 760					
Moelsi	MD	Desktop	Dell	OPTIPLEX 760					
Nalini	MD	Desktop	Dell	OPTIPLEX					

Baijnaith				760					
Next to Mary's Office	Next to Mary's Office	Desktop	Dell	OPTIPLEX 755					
Opposite to Dianne's Office	Opposite to Dianne's Office	Desktop	Dell	OPTIPLEX 755					
Pharmacy	Pharmacy	Desktop	Dell	OPTIPLEX 760					
Pharmacy	Pharmacy	Desktop	Dell	OPTIPLEX 760					
Pharmacy	Pharmacy	Desktop	Dell	OPTIPLEX 755					
Pharmacy	Pharmacy	Desktop	Dell	OPTIPLEX 760					

Richard Butler	Dental	Desktop	Dell	OPTI PLEX 760					
Roxanna	MA	Desktop	Dell	OPTIPLEX 760					
Ruth Ellen	HIV/AIDS Case Worker	Desktop	Dell	OPTIPLEX 760					
Section 1	Dental MA	Desktop	Dell	OPTIPLEX 760					
Section 1	Dental MA	Desktop	Dell	OPTIPLEX 760					
Section 3	MA	Desktop	Dell	OPTIPLEX 760		CPU Intel E7400, 3G RAM			
Section 3	MA	Desktop	Dell	OPTIPLEX 760					

Section 5	MA	Desktop	Dell	OPTIPLEX 760					
Section 5	MA	Desktop	Dell	OPTIPLEX 760					
Server Room	IT	Desktop	Dell	OPTI PLEX 280		IP:192.168.254.17			
Server Room	IT	Desktop	Dell	Dell OPTI PLEX 760					
Sherri Mitchell	Medical Record	Desktop	Dell	OPTI PLEX 760					
Sherry White	MA	Desktop	Dell						
Nnamdi Ihenacho	IT	Desktop	Dell	Dell OPTI PLEX 755					
Small Office	Font Desk	Desktop	Dell	OPTIPLEX 760					

SPARE	IT	Desktop	Dell	Dimension 2400					
SPARE	IT	Desktop	Dell	Dimension 2400					
SPARE	IT	Desktop	Dell	Dimension 3000					
Susan Wood	Slide Coodinator	Desktop	Dell	OPTI PLEX 760					
Tina Mullen	Medical Record	Desktop	Dell	OPTI PLEX 760					
Amy Howard	Medical Record	Fax	Brother	IntelliFax					
Carla Savinon	MD	Laptop	Toshiba	Portege M700					
Erin Williamson	MD	Laptop	Toshiba	Portege M700					

Francine Andrews	Human Resources	Laptop	Dell	Inspiron 2200					
Irvin	MD	Laptop	Toshiba	Portege M700					
Marshelle Powell	MD	Laptop	Toshiba	Portege M700					
Moelsi	MD	Laptop	HP	TouchSmart tm2-1070us					
Nalini Baijnaith	MD	Laptop	Toshiba	Portege M700					
Darcie	MD	Laptop	Toshiba	Portege M700					
SPARE	IT	Laptop	HP	TouchSmart tm2-1070us					
MA	Medical	Latop	EeePC	9COAAS129164					
MA	Medical	Latop	EeePC	9BOAAS4738					

				69					
MA	Medical	Latop	EeePC	9BOAAS473877					
MA	Medical	Latop	EeePC	9BOAAS473880					
MA	Medical	Latop	EeePC	9BOAAS473883					
MA	Medical	Latop	EeePC	9COAAS079797					
MA	Medical	Latop	EeePC	9BOAAS474345					
SPARE	IT	Latop	EeePC	9COAAS129100					
Server Room	IT	Phone System	3COM	V3001 ANALOG		IP:192.168.254.190			

Alfred Thomas	CEO	Printer	Xerox	Phaser 6180					
Althea Johnson	Deputy Director	Printer	HP	Laserjet 3050					
Althea Johnson	Deputy Director	Printer	HP	Officeject 4315					
Amy Howard	Medical Record	Printer	HP	Laserjet 2100					
Avery Acosta	Collection	Printer	HP	Laserjet 2100					
Carla Savinon	MD	Printer	HP	Laserjet 4					
Darcie	MD	Printer	HP	Laserjet 2420					
Douglas DeGroote	Dental	Printer	HP	Laserjet 4					
Font Desk	Font Desk	Printer	HP	HP LaserJet 2100					
Font Desk	Font Desk	Printer	HP	HP LaserJet					

				2300L					
Font Desk	Font Desk	Printer	Zebra	Zebra TLP 2844 Label Printer					
Francine Andrews	Administator Assistant	Printer	HP	Laserjet 2100					
Francine Andrews	Human Resources	Printer	HP	LaserJet 2100					
Guoying Burgess	Accountant	Printer	HP	LaserJet 2300L					
John Ficht		Printer	XEROX	Phase 6180					
Marshelle Powell	MD	Printer	HP						
Medical hallway	MD	Printer	HP	LaserJet P4015n					

Nalini Baijnaith	MD	Printer	HP	Laserjet 2100					
Next to Mary's Office	Next to Mary's Office	Printer	HP	Laserjet 2100					
Pharmacy	Pharmacy	Printer	Lexmark	T652dn					
Richard Butler	Dental	Printer	HP	LaserJet 3015					
Ruth Ellen	HIV/AIDS Case Worker	Printer	HP	Laserjet 4					
Sherry White	MA	Printer	HP						
Small Office	Font Desk	Printer	HP	Laserjet 2100					
SPARE	IT	Printer	HP	LaserJet P4105n					
Susan Wood	Slide	Printer	HP						

	Coodinator								
Server Room	IT	Router	3COM	X5		IP:192.168.254.1			
Alfred Thomas	CEO	Scanner	Panasonic	KV-S1025C					
Amy Howard	Medical Record	Scanner	Panasonic	KV-S1025C					
Douglas DeGroote	Dental	Scanner	Panasonic	KV-S1025C					
Font Desk	Font Desk	Scanner		Intergy Scanner					
Font Desk	Font Desk	Scanner		Intergy Scanner					
Font Desk	Font Desk	Scanner	Panasonic	KV-S1025C					
Rita ludd	South	Scanner		Intergy					

	Office			Scanner					
Server Room	IT	Scanner	Panasonic	Panasonic KV-S1025C					
Sherri Mitchell	Medical Record	Scanner	Panasonic	KV-S1025C					
Tina Mullen	Medical Record	Scanner	Panasonic	KV-S2046C					
Server Room	IT	Server	Dell	Power Edge 2950		IP:192.168.254.10			
Server Room	IT	Server	Dell	Power Edge 2950		IP:192.168.254.13			
Server Room	IT	Server	Dell	Power Edge R300		IP:192.168.254.11			
Server Room	IT	Server	Dell	Power Edge 1800		IP:192.168.254.12			

Althea Johnson	Deputy Director	Speaker	Coby	CS-P14					
Amy Howard	Medical Record	Speaker	Coby	CS-P14					
Avery Acosta	Collection	Speaker	Coby	CS-P14					
Font Desk	Font Desk	Speaker	Coby	CS-P14					
Font Desk	Font Desk	Speaker	Coby	CS-P14					
Font Desk	Font Desk	Speaker	Coby	CS-P14					
Marshelle Powell	MD	Speaker	Coby	CS-P14					
Pharmacy	Pharmacy	Speaker	Coby	CS-P14					
Section 1	Dental MA	Speaker	Coby	CS-P14					
Section 3	MA	Speaker	Coby	CS-P14					
Section 3	MA	Speaker	Coby	CS-P14					
Section 5	MA	Speaker	Coby	CS-P14					

Sherri Mitchell	Medical Record	Speaker	Coby	CS-P14					
Sherry White	MA	Speaker	Coby	CS-P14					
Tina Mullen	Medical Record	Speaker	Coby	CS-P14					
Server Room	IT	Switch	3COM	Baseline 2924		IP: 192.168.254.220			
Server Room	IT	Switch	3COM	Baseline 2924		IP: 192.168.254.221			
Server Room	IT	Switch	3COM	Baseline 2924		IP: 192.168.254.222			
Server Room	IT	Switch	3COM	Baseline 2924		IP: 192.168.254.223			
Server Room	IT	Tap	Dell	PowerVault 114T					

Server Room	IT	UPS	APC	Smart UPS 3000XL					
SPARE	IT	Wireless Router	Cisco	WRT120N					
Server Room	IT	Wireless Switch	Motorola	WS 2000		IP:192.168.254.14			
Server Room	IT	Wireless Switch	Motorola	WS 2000		IP:192.168.254.15			
Server Room	IT		CISCO	IAP2400					
Server Room	IT		3COM.	NBX Gateway Chasis		IP:192.168.254.190			
Server Room	IT		MultiTech System	Call Finder		IP:192.168.254.206			
Server Room	IT		MultiTech System	Fax Finder		IP:192.168.254.205			

Server Room	IT	High Performance Shared Network Storage	Buffalo	Linkstation Pro		IP:192.168.254.20			
	IT (dental server room)	High Performance Shared Network Storage	Buffalo	Linkstation Pro		IP:192.168.254.21			
	dental - Room1	Desktop	Dell	Optiplex 780			G875DQ1		
	dental - Room2	Desktop	Dell	Optiplex 780			G88RDQ1		
	dental -	Desktop	Dell	Optiplex 780			G88QDQ		

	Room3						1		
	dental - Room4	Desktop	Dell	Optiplex 780			G89QDQ1		
	dental - Room5	Desktop	Dell	Optiplex 780			G885DQ1		
	dental - hallway	Desktop	Dell	Optiplex 780			G89RDQ1		
	dental - wet lab	Desktop	Dell	Optiplex 360					

Appendix F.

NHCHC INFORMATION TECHNOLOGY POLICIES

USE OF ELECTRONIC RESOURCES

1. All members of the NHCHC community must maintain good e-mail management habits and adhere to the standards of responsible use
2. Access to electronic resources at the NHCHC is a privilege, not a right, and must be treated as such by all users of these resources. Every user is responsible for the integrity of these information resources. All users must respect the rights of other computer users, respect the integrity of the physical facilities and controls, and respect all pertinent license and contractual agreements related to electronic resources.
3. Users must act prudently and responsibly to both preserve the freedom to acquire and share information and to sustain the security and integrity of individuals within NHCHC. Every user is responsible for the integrity of these information resources. All users must respect the rights of other computer users, respect the integrity of the physical facilities and controls, and respect all pertinent license and contractual agreements related to electronic resources.
4. Users must also understand the ramifications of illegal use, exchange, or display of copyrighted, deceptive, defamatory, or obscene materials on a Web page or through other electronic communication channels.
5. All users shall act in accordance with this policy and all relevant university policies, rules and regulation, including adherence to all relevant local, state and federal laws and regulations.

6. Accepting any account and/or using NHCHC electronic resources shall constitute an agreement on behalf of the user or other individual accessing such information systems to abide and be bound by the provisions of this policy and the principles and guidelines contained herein.

NETWORK AND DATA SECURITY

1. Non-disclosure:
    a. As a condition of employment, data users are expected to access medical records and other health centre information only in the performance of their assigned duties, to respect and adhere to the confidentiality and privacy of individuals whose records they access and to abide by all applicable laws or policies with respect to access, use or disclosure of information.
2. Network Management
    a. System Administrator will apply current industry standard best practices to provide appropriate firewall protection to the NHCHC network perimeter and to associated network segments as appropriate.
    b. Installation of network operating systems and applications will be crafted to provide network protection equivalent to the current industry standard.
    c. Unnecessary open ports and services to servers will be shut off. All open ports must be approved by the System Administrator.
    d. Encrypted sessions will be used for remote administration.
    e. Regular vulnerability assessments will be performed to ensure that network security components perform as expected.

f. Network logging will be performed consistent with NHCHC policy and logs will be reviewed regularly.

g. Retention of log data will conform to NHCHC policy for log data retention.

h. Intrusion Detection Systems (IDS) will be employed where appropriate and feasible.

3. Server Management

   a. System administrator will incorporate anti-virus protective measures and will keep such software up to date.

   b. System administrators responsible for management of central or departmental servers will incorporate an operating environment patch strategy to address security issues as required.

   c. System administrator will institute a procedure to require strong passwords of user accounts.

   d. System administrator will use NHCHC approved software where appropriate to audit passwords and effect remediation of weak passwords.

4. Individual Computers, Laptops, Personal Digital Assistants (PDAs), and other Mobile Computing Devices.

   a. Users of portable computing devices are responsible for the security of the device and its content.

   b. Confidential or protected information on portable computers should be protected using encryption.

   c. Confidential or protected information must not be transmitted to or from a portable computing device unless secure connection and transmission protocols are used.

d. Users of NHCHC owned computers or computers that access NHCHC computers or networks will use NHCHC approved anti-virus protective measures and will keep such software current.

e. Users of NHCHC owned computers or computers that access NHCHC computers or networks will ensure that the computers are kept up to date with all security patches.

f. Remote access to NHCHC networks will use NHCHC approved encrypted VPN. Such VPN access will conform to NHCHC defined methodology to ensure that unauthorized access to NHCHC networks is prevented. When a unique situation exists that requires another type of access (e.g. vendor support), access will be granted only for the duration of the session and will be monitored by the System administrator.

g. Users of NHCHC computers will configure those systems to conform to NHCHC computer security standards. Users of personally owned computers that access NHCHC computers or networks should configure those systems to conform to NHCHC computer security standards.

h. Users of any PDA or mobile computing device that accesses the NHCHC network, whether owned by the NHCHC or otherwise, will use VPN and NHCHC specified encryption when connecting to NHCHC networks.

5. Physical Security

a. Central Servers, Departmental Servers and Network Appliances

I. Physical Access Controls will be implemented to prohibit access to these facilities by unauthorized personnel.

II. Visitors and maintenance personnel should be escorted and monitored while they are in a secure area.

III. All facilities housing central servers, departmental servers, and network appliances will have, where appropriate, fire sensing/extinguishing devices present.

b. Desktop, Laptop and PDAs

I. Users should log off computers when the user is not in the vicinity of thecomputer.

II. All spaces housing personal computers and desktop equipment should be kept locked when not occupied by the employee(s) in order to reduce the occurrence of unauthorized entry and opportunity for theft.

III. Laptops and PDAs used in openly accessible areas should be locked in secure cabinets when not in use. Offices containing laptops and PDAs should be locked when not occupied.

c. General Physical Security Awareness

I. Information pertaining to network structure, password management, wireless access, etc. can be extremely useful to outside hackers and should not be divulged. Report any attempts by strangers trying to gain such information immediately to your supervisor or to System Administrator. Supervisors receiving such reports will immediately notify the System Administrator of the event.

II. Employees are expected to report any unauthorized access, entry or suspicious activity to supervisors immediately.

III. Users will dispose of confidential waste carefully and securely to maintain confidentiality.

6. Business Continuity

   a. System Administrator will be responsible for management of all servers and will create a functional disaster recovery plan containing sufficient information to allow a third party person to access backup media and restore the system to operational status. The plan should consider not only critical IT resources, but also personnel necessary to effect a successful recovery of the system(s) and data. Critical information assets must be identified so that essential business activities are restored quickly to functional levels. This plan should be reviewed and tested manually and modified as necessary.

   b. System Administrators responsible for management of central or departmental servers or data will create multi-generational backups of systems and data on a regular predefined schedule.

   c. System Administrator will secure the current system and data backup in a secure, protected off-site location. Included with that backup will be a hardcopy listing of the contents of the backup, the current version and hardware of the system from which the backup was obtained and a copy of the disaster recovery plan needed to restore the contents of the backup to operational status.

7. Privacy Issues

   The Health Center will not release personal information to external parties without prior consent unless that disclosure is permitted by applicable law and HIPAA. The Health Center may permit the inspection, monitoring, or disclosure of NHCHC

data when access or disclosure is allowed or required by applicable law. This data can include transaction logs, communication logs, pertinent email subject to disclosure, or other records developed in the course of server, systems and network management.

8. Incident Response

   A security incident is an event that causes disruption to normal business activity and that is precipitated by malicious or accidental actions. Examples of incidents include denial of service attacks, computer intrusions or suspected intrusions, hacker episodes, misuse, unauthorized access to IT resources or information.

   a. Viruses and worms

      I. It is the responsibility of the owner or system administrator of NHCHC computers to detect, isolate and repair any incidence of infection by virus, Trojan, or worm.

      II. In the event of infection the owner or administrator should first shut down the affected computer and contact system administrator.

   b. Computer intrusions or system compromise

      I. Incidents of computer intrusion or system compromise will be reported to system administrator

      II. A written incident log of the event will be maintained (dates and times, persons contacted, systems involved) for all events under investigation. This is a critical component, particularly in situations where a criminal investigation may result.

III. The severity of the compromise will be assessed. If the incident is affecting other systems, damaging data, or involving a known root compromise, the incident will be considered critical.

IV. If the compromise is critical, the system will be disconnected from the nhchc network and owner of affected computer will be notified.

V. The system will be restored to an operational state before reconnection to NHCHC network.

9. Wireless access

    a. All wireless access points will be centrally managed and subject to periodic audits and penetration testing.

    b. Wireless infrastructure will be segmented from the nhchc network using a firewall, VPN appliance, router access control list, or similar technology.

    c. Users of the wireless network must be authenticated with unique IDs and passwords.

    d. Confidential data will not be transmitted over a wireless connection unless over an encrypted session.

10. Data Retention

    Retention of data on backup media should be determined by the type of data that is being stored:

    a. Users (faculty, staff and students) are responsible for the security and back-up of all data stored on their individual desktops/laptops (including, but not limited to, e-mail and office files). Data is to be backed up on media separate from the internal hard drive (such as USB drive, external hard drive, or other removable media). The user is responsible for the safe and secure storage

of all external back-up media. Data stored on centrally managed servers is automatically backed up.

11. Employee termination and exit procedures

    Upon notification that an employee intends to voluntarily separate from the health center, the employee's supervisor will take the steps necessary to ensure that:

    a. No unauthorized transfer of NHCHC data is made from NHCHC servers or other computers to any personal computer, mobile computer, storage device or portable media.
    b. No unauthorized transfer of NHCHC institutional data is made from NHCHC servers or other computers to any other computers via the network.
    c. No software licensed by the NHCHC is copied or transferred to the employee unless the employee has a license to personally possess that software or the software is in the public domain.
    d. Any transfer of personal data or information from a computer owned by NHCHC shall be made under supervision at all times.
    e. Upon involuntary termination of an employee, the employee's supervisor will take the steps necessary to ensure that all access to NHCHC computers, including desktops and mobile computing devices, is denied.

12. Non-affiliate access

    There are business needs for NHCHC to provide vendors and other non-affiliated third parties access to the NHCHC's information technology resources and networks. For example, vendors assist in support of information technology resources like Earney Consulting.

a. Non-affiliate access to NHCHC IT resources must be authorized by appropriate personnel i.e. a Senior Manager or higher position within NHCHC.
b. The level of access granted will be limited to those IT resources that are required to carry out the specified business need of NHCHC.
c. The access must be enabled for specified tasks and functions, and limited to specific individuals and only for the time period required to accomplish approved tasks.
d. Non-affiliate access must be uniquely identifiable, and password management must conform to NHCHC policies.
e. The non-affiliate must agree to comply with all applicable Federal and State statues and NHCHC policies concerning acceptable use of NHCHC IT resources and policies concerning the preservation of the confidentiality of the information to which they have access.
f. NHCHC may, based upon the likelihood of exposure to confidential information, require that the non-affiliate agrees to an instrument of confidentiality.

USER ACCOUNTS AND AUTHORIZED ACCESS

a. All users must respect the rights of other computer users, and take care in acting responsibly to safeguard the security and confidentiality of electronic resources, information, and similar assets.
b. Users are responsible for all use of their computer account(s). They should make appropriate use of the system and network provided protection features and take precautions against others obtaining access to their computer resources. Individual

password security is the responsibility of each user. Users should respect the policies of external networks and remote sites and only use facilities for which they have been authorized.

c. Users may not supply false or misleading data, nor improperly obtain another's password, in order to gain access to computers or network systems, data or information. The negligence or naiveté of another user in revealing an account name or password is not considered authorized use.

d. For the computers and network systems, all access privileges; including all accounts, user IDs, network IDs and any other such access codes are granted for exclusive and individual use of the individual to which they are assigned. Users may not allow or facilitate access to NHCHC computer accounts, equipment, restricted files or systems by Users should not attempt to subvert the restrictions associated with their computer accounts.

e. When the user's relationship with the NHCHC is terminated, he or she shall be denied further access to NHCHC computing resources. Authorized use also terminates unless extended by an appropriate NHCHC official.

SECURITY

a. Users are responsible for the security of their own account and password and are responsible for actions taken from their account. Users should keep their accounts secure and private. Users will use strong passwords when authenticating on to all NHCHC automated systems. Strong passwords are defined as eight or more characters with a combination of upper case, lower case, alphanumeric and special characters.

b. Users are responsible for the security and back-up of data stored on their individual desktops/laptops (including, but not limited to, e-mail and office files). Data is to be backed up on media separate from the internal hard drive (such as USB drive, external hard drive or other removable media). The user is responsible for the safe and secure storage of all external back-up media. Data stored on centrally managed servers is automatically backed up.

c. Each user's individually owned programs and proprietary information are considered user’s property. Users shall therefore not attempt to access, read, copy, modify, distribute, replace, delete or otherwise make use of any other user's account or its contents, including data, directories, programs, files, disks or other information or software assets.

d. Users shall not access or attempt to gain access to any other system accounts or to any nonpublic or restricted portions of the NHCHC network. Users also shall not intercept or attempt to intercept data or voice transmissions of any kind. Electronic resources shall not be used to attempt to circumvent or defeat any system or account security. Examples of activities of this type would include but not be limited to the use of any program or procedure that is designed to: obtain other users' passwords; obtain access to restricted programs, systems or data; modify restricted programs, systems or data; obtain privileges beyond those initially granted to the user account. Forging, fraudulently altering or falsifying, or otherwise misusing NHCHC or non-NHCHC records (including computerized records, permits, identification cards, or other documents or property), or to possess such altered documents or files is also prohibited.

e. Users will not facilitate, support, cooperate with, or in any manner through action or lack of action assist others in the activities defined above. Neither shall electronic communications be used to steal another individual's works, or otherwise misrepresent one's own work.

f. NHCHC has a right to expect that computer users will properly identify themselves. Computer accounts are assigned and identified to individuals. Users must not misrepresent themselves or send anonymous communications. All material prepared and utilized for purposes of NHCHC business and posted to or sent over NHCHC computing equipment, systems or networks must be accurate and must correctly identify the sender, unless an NHCHC administrator (department chair or higher) approves anonymity for an NHCHC business purpose. Users must provide proper and correct sender identification in all electronic correspondence within and leaving NHCHC electronic resources. Forging, fraudulently altering, or willfully falsifying electronic mail headers, electronic directory information, or other electronic information is strictly forbidden. Adding, removing or modifying identifying network header information in an effort to deceive or mislead is prohibited. Attempting to impersonate any person by using forged headers or other identifying information is prohibited.

CONFIDENTIALITY

a. Any person who has been authorized to use and/or to access the electronic resources shall be expected to regard all personal, confidential, copyrighted, or proprietary information which may thereby become available to him/her as confidential, unless he/she obtains from the owner or designated administrator specific written

permission to view, copy, modify, or otherwise access or use any part of it. Users should respect the privacy of others and comply with the confidentiality laws. Except as set forth in this policy, electronic resources will not be used to abridge the confidentiality or privacy of other users' information or similar assets.

b. NHCHC is the custodian of a wide array of personal information, patient medical records and financial data. Users shall respect the health center's obligations of confidentiality as well as their own. Only those with specific authorization may access, communicate, or use confidential information

HARRASSMENT, THREATS, STALKING AND SIMILAR ACTIVITIES

a. Users may not use electronic communications to harass, stalk, or threaten others, or in similar ways create an atmosphere which unreasonably interferes with employment experience. Generally, communication that contains abusive, offensive or intimidating language and is repeated, unsolicited, unwanted or unwelcome may constitute harassment.

b. This would include, but not be limited to, posting, transmitting, or originating any unlawful, threatening, abusive, hostile, fraudulent or defamatory communication, or any communication where the message, or its transmission or distribution, would constitute or would encourage conduct that would constitute a criminal offense, give rise to civil liability, or otherwise violate any local, state, national, or international law or violate other policies, rules and regulations of the Center. Information that is defamatory is defined as provably false, unprivileged statements that do demonstrated injury to an individual's or a business's reputation.

c. Users will also not post or disseminate personal or sensitive information about an individual(s). Such information would include, but not be limited to medical records, social security number, or similar information of a personal and confidential nature that, if disseminated, could have legal or otherwise damaging implications either for the targeted person or the institution.

ABUSING, DAMAGING OR DESTROYING ELECTRONIC RESOURCES.

Users must take care not to engage in activities that, without proper authorization:

a. Overload the computing systems and networks, such as excessive use of processor time, data storage, or bandwidth, or activities which otherwise impair or negatively impact performance and availability;
b. Interfere with, disable, damage, obstruct, or in similar manner impede the normal function and accessibility of computer or communication systems, or computer data, files and other information;
c. Waste or hoard computer or network resources in ways that interfere with the operation of the system or its availability to others;
d. Attempt the unauthorized connection, removal or modification of computer or communication devices; In any way physically abuse, damage, or destroy computing or communication systems, data, or facilities;
e. Disseminating or launching any executable program designed to damage systems or data, or place excessive load on a computer or network affecting its performance or availability.

EMAIL ABUSE:

Users are prohibited from engaging in activities involving email that violate this policy or cause harm to resources and to other users. Among the activities prohibited under this policy are:

a. Sending frivolous or excessive messages, including junk mail, “spamming”, “chain letters”, and other types of unsolicited messages;
b. Sending unauthorized broadcast or mass email messages.
c. Interfering with the normal operation and availability of electronic communication systems and services such as e-mail.

VIRUSES AND HOAXES:

Because of the level of threat associated with this level of networked community participation, users have certain responsibilities that include the following:

a. Protecting themselves, their colleagues, and the NHCHC community through virus protection software.
b. Maintaining Virus definitions associated with the software at current levels as provided for by the manufacturer of that product.
c. Refraining from downloading, transporting, posting, transmitting, or launching material such as a computer virus, worm, Trojan horse, or similar damaging rogue entity that is illegal or damaging to a NHCHC computing or communication device.
d. Refraining from disseminating or conveying to other users hoaxes or other false information concerning viruses or similar threats.
e. Users should contact the System Administrator for information concerning viruses and NHCHC’s electronic resources for the presence of threats such as viruses, and to

eliminate those messages and files found to contain them to ensure protection of systems, data, and all users.

SERVER STANDARDS AND MANAGEMENT

NHCHC servers are mission critical resources that are utilized by all NHCHC staff. It is essential, therefore, that these resources be managed effectively to ensure maximum availability, accessibility, and operational efficiency in support of academic offerings and administrative requirements.

A. Administrative Provisions

1. Operating System Software
    a. Operating systems are based on NHCHC needs and, in many instances, determined by the application vendor.
    b. The level of operating system support provided by System Administrator for decentralized servers varies based on the applications running on the server and the availability of support personnel.
    c. System Administrator is responsible for determining the need and relevancy of operating system updates, service releases, and emergency patches. System Administrator will take appropriate action depending on the urgency of the update.
    d. System Administrator will endeavor to inform all affected individuals of operating system changes and possible issues which might arise from those changes well in advance. System Administrator will attempt to minimize the negative impact on users through flexibility in scheduling updates.

e. System Administrator will take all reasonable steps to ensure data integrity during system updates.

f. All operating system updates on production systems will be implemented in accordance with the Change Control Procedure.

g. System Administrator will maintain a current system software inventory.

2. Application Software

a. All software to be installed on NHCHC production systems that are managed by System Administrator must be approved by the deputy Director of NHCHC.

b. All application changes will be implemented in accordance with the Change Control Procedure. Emergency updates, as determined by the director, will be given priority over previously scheduled events.

c. Applications may be disabled or removed from NHCHC systems at the discretion of System Administrator for specific reasons. Reasons would include, but not be limited to:

    i. Malfunctions or functions in an unauthorized manner.

    ii. Causes the operating system to be unstable.

    iii. Causes other applications to malfunction.

    iv. Causes or has strong potential of causing data loss.

    v. Poses a credible security risk.

    vi. Is not supported for the current version of the operating system.

d. Applications software must be maintained to be compatible with the current operating system version.

3. Hardware:

a. System Administrator will endeavor to implement “state of the art” yet affordable computer equipment to support NHCHC mission. The IT and Opeerations department will work to ensure that all equipment meets NHCHC requirements for stability, reliability and security.
b. Support for applications and software that aligns with the NHCHC mission will be the determining factor in the decision to support a new hardware platform or remove an existing platform.
c. System Administrator will strive to minimize the number of hardware platforms to the minimum required in order to accomplish the NHCHC’s mission.
d. Depending on the critical nature of the supported applications, System Administrator may require external (vendor or contracted) support for hardware and operating system environments.
e. System Administrator will maintain a current hardware inventory.

4. Disaster Recovery
    a. System Administrator is responsible for maintaining, testing and continuously improving the plan for recovery of servers and multiuser computers in the event of a disaster.
    b. System Administrator will take all reasonable measures to ensure the safety, security and recoverability of data stored on supported systems.
    c. The order of restoration of services is dependent upon the scope and extent of the disaster, the number of failed systems, and the level of importance to NHCHC operations.

d. When possible, System Administrator will maintain a secondary computing site with computer hardware available to rapidly allow some level of restoration of service for the highest priority systems.

5. Networking
    a. System Administrator will only utilize network protocols defined under Network Standards and Management.
    b. System Administrator must take all reasonable care to enable only services on a server that are required to fulfill the function of that server. For example, if Web services are not needed on a server then port 80 should not be open on that server.
6. Handheld and Pocket PCs
    a. Handheld and Pocket PCs that require access to servers and multiuser computers must adhere to the same standards as desktop and laptop computers. Users must authenticate with a username and password before access is allowed.
7. Security and Encryption
    a. All password information must be stored in encrypted format on all electronic resources.
    b. Encryption standards are recommended by System Administrator to the Director of Operations/ Deputy Director.

NETWORK STANDARDS AND MANAGEMENT

NHCHC communications networks are mission critical resources that are utilized by all NHCHC staff and guests. It is essential, therefore, that these resources be managed effectively to ensure maximum availability, accessibility, and operational efficiency.

1. All wireless communications must be encrypted. The wireless network is available for nhchc staff, vendors and other guests present on NHCHC facility to conduct business related to the NHCHC and is only to be utilized in strict adherence to all NHCHC policies. The guest wireless network cannot access any NHCHC resources.
2. Network Hardware/Software (Routers and Switches)
    a. The physical network standard on nhchc is exclusively Ethernet, IEEE 802.x. The wireless Ethernet strictly adheres to the 802.11x and 802.11g standard.
    b. The connection of any network device to the nhchc network without the prior knowledge and expressed permission of System Administrator is prohibited.
    c. It is important to use enterprise-wide network protocols to allow integration, reliability and help maintain simplicity in a large complex network as the enterprise continues to evolve. Although other protocols are not strictly prohibited, the primary protocol supported on the NHCHC communications networks is TCP/IP.
3. Disaster Recovery
    a. System Administrator is responsible for maintaining, testing and continuously improving a plan for recovery of the communications networks in the event of a disaster.
4. Device Registration and Address Allocation
    a. All hosts (computers) except servers on the NHCHC network have IP addresses assigned dynamically using DHCP except otherwise assigned by System

Administrator. If IP addresses of two or more hosts are not unique, the machines will not function properly, and they may disrupt network services.

b. Members of staff needing to connect a new device to the nhchc network should contact the System Administrator for assistance.

5. Network Guidelines

NHCHC communications networks are a limited resource that exists to facilitate the goals and mission of the Health Center. Users may not infringe or encroach on the availability or use of the health center network by others. Examples of activities not allowed include (but are not limited to):

I. Using an IP addresses that has not been assigned or approved by System Administrator.

II. Allowing a node or system on the network to become “open” to the extent that it is a target for hackers and a possible launching pad for an internal attack on the nhchc network or the Internet in general.

III. Monitoring or “sniffing” data on the network.

IV. Flooding the network, either intentionally or unintentionally.

V. Running a commercial or for profit service on the network.

VI. Establishing, enabling, or providing network services that interfere with the normal operation of the nhchc communications networks or users of the network, or that create security risk and exposure.

VII. Installing Wireless Access Points.

VIII. Installing Firewalls other than software firewalls.

IX. Installing Ethernet switches or routers.

6. Failure to comply with the above guidelines can lead to the following actions:
    a. For minor violations, the person responsible for the identified system will be contacted and asked to correct the situation.
    b. For major violations, the system will be disconnected from the network pending further administrative review and action.

Purchase, Inventory, Replacement, Administration of surplus of IT resources.

The NHCHC Lifecycle Replacement Plan is designed to cycle equipment into and out of operation on a one-to-one ratio. In addition to this plan, System Administrator is responsible for maintaining equipment standards and establishing a Baseline. Establishing baselines for equipment purchases will ensure user access to quality and up-to-date computer equipment through a cost effective model based on controlled equipment costs and leveraged purchasing. This will also establish a process for exceptions for purchasing equipment outside the baseline and for ensuring that the necessary tools (such as software) are in place to manage the purchase, inventory etc.

1. Approval

All computers purchased with NHCHC funds must meet these requirements or request for an exception must be sought. Exceptions are reviewed and acted upon on a case by-case basis by Operations.

A. Computer Purchases:

    a. Computer purchase guidelines apply to all computers purchased.
    b. Lifecycle purchases are leveraged to maximize the benefit of available funds and all purchases are aligned with established Baseline Standards or approved exceptions.
    c. System Administrator monitors compliance of equipment purchases.

d. Waivers and exceptions to the baseline standards are granted on a one-time basis based on justification.

B. Computer Inventory:

a. Computer inventory guidelines apply to all computers under $5,000.
b. Each department/division is responsible for maintaining an accurate listing including serial number and location of their computer equipment.
c. Each department/division will be asked to validate the centrally managed inventory of computer equipment.
d. System Administrator may require special software and/or network access for all computers as a means to maintain security of computers and more importantly data residing on the computers.
e. Submission of a completed inventory by each department/division is required for eligibility of life cycle purchases.

C. Lifecycle Replacement Plan:

a. The Lifecycle Replacement Plan focuses on computer technology replacement.
b. The plan is managed by System Administrator with direction regarding unit assignment provided by representatives from the various departments.
c. Funding for the plan flows as Senior Management as deemed important to the business and is utilized in accordance with the goals of the senior officers of the administration units.
d. Each staff member can identify one system, either a desktop or laptop, as their primary system to be replaced with lifecycle funds.
e. Timeline for tracking the replacement of lifecycle funded computers:

I. Department/divisions receive Lifecycle information at a specified month of the year as decided by Management requesting their prioritization in their respective area for the fiscal year. In addition to a current inventory, they should have a list of new computer locations and roll down/removal of other equipment.

II. Each department/division determines which computers will be removed from their inventory during the current fiscal year. The number of computers designated for removal should equal the number of computers being purchased for that department/division. This is essential in order to prevent a proliferation of aging, obsolete, out-of-warranty, unsupported, and incompatible systems. It is also essential for maintaining the number of computers that comprise the lifecycle replacement population in order to preserve the integrity and validity of the Lifecycle Replacement Plan.

III. Each department/division then provides the System Administrator a list of equipment to be removed from their inventory with the computer serial number. This list must be provided prior to distribution of new equipment.

Access to Information Resources and Data.

Information resources and data that support the primary administration of NHCHC are accessed through broad impact systems and software, and/or data sets stored and maintained on NHCHC servers. The management of systems and software for the NHCHC is the responsibility of the System Administrator. Management of computer systems also is the responsibility of the Systems Administrator. System Administrator is responsible for

ensuring the integrity and confidentiality of NHCHC information resources and data residing on broad impact systems and software on NHCHC servers.

1. System Administrator is responsible for ensuring the data integrity and confidentiality such that access to the data is limited to the minimum required relative to job responsibilities of each individual or the individual's right to know., including
2. User's password information is for their exclusive use. Sharing password information will result in revocation of access privileges.
3. User access is limited to only those networked computer resources and privileges directly required to perform assigned duties, at the discretion of the appropriate Senior Manager, Deputy Director or CEO.
4. Accounts are generally limited to NHCHC staff (including adjunct and part time). Accounts for contractors or time limited employees may be granted based on need established by the appropriate Senior Manager, Deputy Director or CEO..
5. Time limited user accounts will have an expiration date.
6. Service accounts may be allowed if they meet the following criteria
    a. Requested by department head or senior manager.
    b. Serve a demonstrated need not achievable by other means.
    c. A responsible person within the department or operating group is designated.
    d. Highly restricted in regards to access to intradepartmental information only.
    e. No need exists to track any transactions the account may generate.
7. All user accounts are subject to password aging.
8. Blank passwords are not allowed.
9. User Accounts are locked out after five invalid login attempts.
10. Passwords are reset by computer operations staff.

11. Groups will be formed of users with a need for common resource access. Members of these groups will be added or removed at the request of the Department head, Deputy Director, CEO or an assigned designee.
12. Notice of Termination of employment received from Human Resources for staff will result in the user account being removed.

Appendix G. – VDI Vendor Recommendations

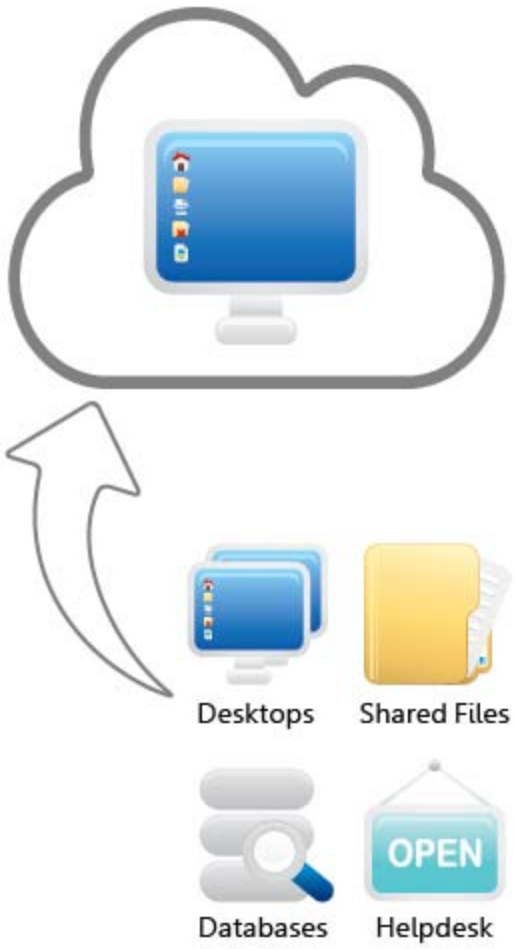
npBase Proposal

About npCloud

npCloud ensures that no nonprofit has to make that compromise between their mission and their technology.

In many nonprofits technology falls behind mission in importance and investment, and understandably so. But the lack of prioritization leads to chronic under-investing. By the time nonprofits try to catch up, they are too far behind; a simple technology upgrade becomes cost-prohibitive.

We also set a goal to ensure our solutions are enterprise-class, extremely affordable (to the point where cost is not a barrier), and accessible by a wide variety of charitable organizations. In short, we ensure that nonprofit organizations everywhere are enabled by technology rather than constrained by it. When purchases are required, npCloud works directly with manufacturers for donations and discounts. We leverage the buying power of the entire community we serve.



Best of all, our solutions never need updating. We ensure that the nonprofits we work with always have the latest and best solution for them, all at no extra cost. This way no nonprofit is left behind.

When it comes to nonprofit technology, we're the good guys and gals for the good guys and gals.

About npBase

We all know the drill. We spend $10,000 on a server that needs to be replaced in 4 years, and $1000 on a desktop that needs to be replaced in 3. So we write grants and hope that we'll be able to replace both inside of a decade. Then the maintenance bills mount. Each month we spend hundreds just to keep the whole system running. As the system gets older, the bills go up.

Instead of the huge upfront fees that make you run out in search of a grant. And instead of the hundreds of dollars paid monthly just to maintain those decaying machines. Gain access to maintenance-free servers and/or desktops in the cloud for a flat monthly fee.

For your users it will be the same as having a new computer on the desk or a new server down the hall. But now, your infrastructure will be:

Protected against catastrophe – you don't have to worry about sprinklers going off.

More accessible – everyone in your organization, no matter where they are located, gets the same experience and access.

A money-saving machine because now your hardware is never out of date and never needs to be fixed.

npBase will transform your organization's technology.

Technology Overview

npCloud is dedicated to providing your organization with cloud-based solutions that meet your nonprofits needs, help you focus on your mission, and ensure predictable and affordable costs. Cloud Servers and Cloud Desktops help achieve these goals, but what exactly are they?

Cloud Desktops

The technical term for Cloud Desktops is Virtual Desktop Infrastructure, or VDI. With VDI technology your desktop runs in the cloud. This Cloud Desktop still runs Windows 7; it still has Office 2010 and the Access Database your organization uses to track constituents. However, you don't need to maintain a dedicated physical computer. Instead, dozens of Cloud Desktops run on redundant server hardware in a datacenter. This reduces the cost of maintaining a desktop.

Accessing your Cloud Desktop

To access your Cloud Desktop you'll use your existing computer, a tablet, or a Thin Client. These devices need to run only a single piece of software – the npBase client application. Because your Cloud Desktop runs on state-of-the-art servers the local device you're sitting at doesn't even need to be particularly powerful. You'll have the same user experience on that donated 8 year old PC as on a brand new $4000 laptop. Plus, since all your data is stored in the Cloud, it won't matter if the local computer fails. Just swap it out for another donated computer! You can even access your Cloud Desktop from multiple computers. npBase charges only for bandwidth between your office and your Cloud Desktops. Traffic between Cloud Desktops, between Cloud Desktops and Cloud Servers, and between Cloud Desktops and the internet is free. Access to Cloud Desktops requires an average of approximately 120 kilobits per second per desktop. This works out to approximately 8 Cloud Desktops for megabit per second of internet bandwidth.

Benefits of a Cloud Desktop

Besides the speed, security, and easy access Cloud Desktops offer a user experience identical to a traditional desktop PC with the benefits of terminal technologies. When your organization first configures npBase we'll help you create several "gold images." These

gold images are Windows 7 environments with the software that your users need. We'll then deploy these gold images to all of your users Cloud Desktops.

Users can personalize their Cloud Desktop by adding files, changing their wallpaper, configuring applications, etc. However, all other changes (software installation, viruses, etc) are automatically wiped out every time the user logs off of the computer and back on1. Your users won't be forced to stop working due to a virus or computer issue ever again.

1 some of this functionality is dependent on the type of Cloud Desktop you purchase, see page 5 for details

Plus, when you want to install a new application or update an existing application you only need to make the changes to your gold image. Those changes are then automatically rolled out to all of your Cloud Desktops. Desktop management is finally painless.

Cloud Servers

Cloud Servers provide your organization with the same user experience as that server in your closet – our Cloud Servers run Windows Server 2003 or Windows Server 2008 R2. npBase allows your organization to get access dedicated servers with full administrative permissions. You can install any software you want to provide services to your users. In

addition to dedicated servers, npBase includes file server services for your organization at no charge. You only pay for data storage.

Accessing your Cloud Servers

Your users with Cloud Desktops will access Cloud Servers the same way they access in-house servers now. Users not using Cloud Desktops can access your Cloud Servers through a VPN connection. If these users are in an office npCloud can help you configure a hardware VPN between that office and the npBase datacenter. Your users can then access Cloud Servers without any additional configuration or headache. Users traveling outside of an office can establish a software VPN connection using tools built right into Microsoft Windows.

npBase charges only for bandwidth between your Cloud Servers and the internet. Traffic between Cloud Servers and between Cloud Desktops and Cloud Servers is free.

Cloud Management Servers

Cloud Management Servers provide security (active directory) and networking services to your organization. npBase allows you to choose between three different types of Cloud Management Servers.

Shared Management Servers reduce the costs to your organization by sharing infrastructure with other nonprofit organizations. Your data remains secure and other organization will not have access to your data. This solution is perfect for small organizations that can use locally managed desktops without an active directory domain.

Dedicated Management Servers provides your organization with a dedicated firewall, session broker, and security (active directory) server. Neither your data nor your data transfer runs through Cloud Servers or Cloud Desktops in use by other organizations. When combined with a hardware VPN this option also allows you to join your local computers to your new npBase domain and add local network printers to your npBase file server.

Basic: A Cloud Desktop without personalization or persistent storage. Ideal for labs and staff that only use web-based applications.	**Basic $25/month**
Standard: A Cloud Desktop that supports personalization and persistent storage. Standard Cloud Desktops meet most users' needs.	**Standard $35/month**
Premium: Provides a Cloud Desktop similar to a traditional desktop with administrative access. User can install custom applications.	**Premium $50/month**

Integrated Management Servers provide you with all of the benefits of Dedicated Management Servers but allows you to maintain an on-site Active Directory server. Your Cloud Management Servers will synchronize with your local active directory server.

Ongoing Cloud Services

npBase provides nonprofit organizations with cutting edge tools at predictable costs. npBase services included Cloud Desktops and Cloud Servers.

Cloud Desktops

With npBase, your desktop is in the cloud. Using almost any device you can connect to your virtual desktop and work as if you were sitting in front of a normal computer. You'll work just like you do now, but faster and from anywhere. There are three different types of Cloud Desktops available, each with different features.

Feature	Description	Basic	Standard	Premium
Customization	Allows users to customize applications and their desktop like a typical desktop	No	Yes	Yes
Local	Allows users to	No	No	Yes

Administrator	install custom applications on their individual Cloud Desktop			
Persistent Storage	Storage for local customizations, files, and applications	No	2GB	15Gb
Outlook	Method users will use to access their email and shared resources	Outlook Web Access	Full Outlook	Full Outlook
Offline Access	Allows users to download the desktops for use off-line	Yes	Yes	No

Cloud Servers

With npBase, your server is in the cloud. All of our servers are constantly backed up and we can migrate you to a new one before you even know there's a problem. You won't ever need to worry about your server again.

npBase provide your organization with file services at no cost. Your organization only pays for the data used. Note that these file services run on either shared or dedicated Cloud Servers as outlined in Cloud Management on page 6.	**File Server** **$0/month**
npBase can provide you with a dedicated Cloud Server to host specialized applications for your users.	**Custom Server** **$280/month**

CPU	1 virtual processor included
Memory	2 gigabytes of memory included
Storage	25 gigabytes of storage included
Backup	Image level backups for disaster recovery are performed nightly to the same geographic location. Data-level backups are performed nightly to two different geographic locations.
Maintenance	npCloud monitors your server and backups for issues. npCloud will resolve any issues identified remotely.
Support	npCloud provides phone and remove support

	for servers.

Cloud Management Servers

npBase provides centralized security to your users through two different options.

In addition to one of these management options npCloud charges for bandwidth between your organization and the datacenter. Data transfer between your Cloud Desktops and Cloud Servers is free. Data transfer between your Cloud Desktops and locations other than your network is also free (ie, web browsing from Cloud Desktops).

Shared Management: Your organization shares security service with other nonprofit organizations. npCloud ensures that other organizations do not have access to your data or settings.	**Shared** **$100/month**
Dedicated Management: Your organization has a dedicated firewall and security server. npCloud manages these services for you.	**Dedicated** **$280/month**
Integrated: npCloud provides you with a dedicated firewall and integrates with your existing security server. This solutions allows you to use existing usernames and passwords with npBase but require that you maintain a server onsite.	**Integrated** **$350/month**

In addition to one of these management options npCloud charges for bandwidth between your organization and the datacenter. Data transfer between your Cloud Desktops and Cloud Servers is free. Data transfer between your Cloud Desktops and locations other than your network is also free (ie, web browsing from Cloud Desktops).

Bandwidth: Note that each Megabit of bandwidth can support approximately 8 Cloud Desktops.	**$20/month per Megabit/second**

Ongoing Support

npCloud understands that technology issues don’t end with the setup process. We know that your organization needs ongoing support to keep things running smoothly and get the most out of technology investments. With npBase your support costs are included in the cost of services. Every Cloud Desktop and Cloud Server includes support. Your users can call our toll-free number to reach our technical support team. npCloud will resolve any issues with existing services at no additional charge.

Cloud Desktop support includes:

- Toll-free and email access to our support team
- 2 hour call-back window
- Cloud Desktop resets to resolve virus and configuration issues
- Password reset requests
- New desktop provisioning
- Operating system and application updates every two months (must be individually approved by your organization)
- Note: desktop data is not backed up.

Cloud Server support includes:

- Toll-free and email access to our support team
- 2 hour call-back window
- Ongoing monitoring and maintenance including anti-virus and operating system updates
- Operating system and service troubleshooting (advanced application

troubleshooting is the responsibility of software vendor)

- Data backup and restoration services

Configuration and Migration

You know what your nonprofit needs to thrive, but that doesn't always translate into technical details. npCloud will work with your organization to understand its needs and configure npBase. We'll also make recommendations along the way to help your organization find new efficiencies and support your programs better than before.

Don't worry about the details; let us walk you through the process.

Non-Recurring Implementation Fees

In addition to configuration and data migration npCloud will charge you a non-recurring implementation fee for each device (cloud desktop, cloud server, cloud firewall, etc) included in this proposal. New devices added after the completion of implementation will also incur these fees.

These fees are charged to npCloud by third-party service providers. They are equal to approximately one additional month of service.

Cloud Desktop Configuration

npCloud will work with your organization to create up to three separate "gold" images. These images will be used for the organization's Cloud Desktops. npCloud will then deploy these gold images to the desired Cloud Desktops.

Local Device Configuration

Your organization is expected to configure local desktops for use with npBase.. Users will be expected to configure mobile devices on their own with phone support from npCloud. Note the minimum requirements for npBase below.

Desktops

- Windows XP SP3, Windows Vista SP1, or Windows 7 or higher
- Mac OS X 10.6.8 or 10.7.0 or Later
- Intel based processor
- 2GB of RAM

NOTE: Offline mode requirements at least 4GB of RAM. Offline Cloud Desktops run at the speed of the host computer. Cloud Desktops must be downloaded before use offline, time required will depend on the user's internet connection.

Thin clients

- Thin clients must support the Vmware View client 4.6 or later.
- Vmware provides a compatibility tool to check for support. This tool can be found at http://www.vmware.com/resources/compatibility

Mobile Devices

- Android 2.2 and up
- iOS 4.2 and up

Network Configuration

npBase will configure three separate sites with hardware VPN access to npBase. Users traveling off-site will use the encryption methods built into the Vmware View access client to access npBase. A firewall supporting IPSec VPN tunnels with at least 50Mbps of throughput is required for hardware VPN access to npBase.

Training

npCloud knows that the biggest predictor of technology success is user involvement and training. We are committed to working with your users to ensure a painless migration.

End User Training

npCloud will provide end-user training to each site as part of the on-site configuration services. Users will be provided documentation and training for accessing npBase along with considerations required when using a Cloud Desktop solution.

Admin Training

Our goal is to provide your nonprofit with sustainable solutions. To that end, npCloud provides admin training to every organization you administer npBase. This training will help between one and three of your staff members create users, reset passwords, change password, configure desktops, and more.

N-Computing – L300 Ethernet Virtual Desktop.

Enterprise IT departments are actively searching for less expensive ways to purchase, deploy, and manage employee desktops. Desktop virtualization has been considered the cure-all for this headache, but users are still concerned about virtual desktop performance and multimedia support. NComputing shatters this perception by delivering rich multimedia playback, powerful yet simple deployment and management tools, and an industry-leading price point via its next-generation access device—the L300 virtual desktop with vSpace™ Server desktop virtualization software. NComputing, the market leader in deployed virtual desktops, has delivered more than 2.5million low-cost access devices worldwide. The newest access device, the L300 virtual desktop, delivers rich full-screen, full-motion

multimedia playback; transparent USB redirection; and unparalleled peripheral support. Combined with the NComputing vSpace Server, the L300 now provides enterprises with a simple-to-deploy, low-cost means to implement a complete virtual desktop infrastructure in hours.

vSpace Virtualization Software—Get More From Your VDI Investment

NComputing vSpace Server enables enterprises to optimize virtual desktop deployments by providing multiple end users with simultaneous access to a single operating system instance of either Windowsor Linux. vSpace not only integrates into virtualization server deployments based on VMware, Citrix and Microsoft offerings, but can also extend their value by changing the typical virtual desktop structure from one user per virtual machine to 100 users per virtual machine. This has a direct, positive impact on operational expenses and immediately lowers

overall desktop PC costs such as support, maintenance, and desktop replacement.

The L300 Access Device—Next-Generation Media Acceleration

With the L300, watching DVD-quality video on up to a 1920x1080 display comes standard for most common media formats. The game-changing access device comes packaged in a sleek low-power package that can be easily mounted on a monitor or secured to a desk. Powered by a new NComputing Numo System on a Chip (SoC), the L300 uses patent-pending hardware technology to decode and scale multimedia locally, eliminating network strain. The L300 access device costs less than any other thin- or zero-client options and a

quarter of the cost of desktop PCs. In combination with the NComputing vSpace Server, it enables VDI solutions at one-third

L300 Key Features

• Performs in Your Environment

Whether playing DVD-quality full-screen video or connecting specialized USB 2.0 devices, the L300 has the power and flexibility to work in the environment you choose.

• Fits Your Budget, Today & Tomorrow

The L300 redefines performance and value for thin-client or zero client devices. A complete virtual desktop solution can be deployed for less than half the cost of PCs, with ongoing management savings of 75% and power
savings of over 90%.

• Easy to Deploy

Whether you need four workstations in a remote branch office or four-thousand in a corporate office, the L300 can be deployed easily using vSpace management tools.

• Easy to Manage

The L300 is a zero management client. Once deployed, there are no applications, software, or drivers to manage on the device. vSpace software centrally handles firmware changes without requiring user intervention.

Feature	Function	Benefit
Host-optimized video	Video content played through standalone media players or	Users will experience PC-quality video without excessive host-side

acceleration	embedded into web pages may be transcoded, streamed, locally decoded, and scaled up to 1920x1080 resolution at full frame rates	processing or requiring a local PC or thin client with media player and codec support
High-availability login	Administrator may define a failover group list of hosts to which devices may automatically connect	Each user can be assured a login within seconds, even in the event of a host failure, without complex central management servers and agents
Express deployment tools	Administrators may define a device template with all settings and configurations so that it may be cloned and pushed to new devices	Thousands of devices may be easily deployed without manual configuration—and without requiring the installation of complex centralized management infrastructure
VMWare and Citrix support	Leverage VMware to deploy multiple instances of vSpace, multiplying the number of users per server, or integrate the Citrix Receiver to deploy XenApp-based	Extend the benefits of vSpace and the L300 for large deployments by leveraging server and application virtualization technologies

	applications	
Zero Management	The L300 is easy to configure and automatically receives updates from deployed vSpace servers	The L300 is easy to configure and is automatically managed by the vSpace server, unlike thin clients that require complex management tools to deal with locally installed applications or so-called “zero clients” that require complex networking and management server setup
Transparent USB redirection	The L300 includes 2 USB 2.0 ports that transparently redirect bulk, HID, mass-storage class, and printer devices back to the server where the native driver is installed	No local management of drivers is required to support USB devices
Zero-footprint Installation	The L300 includes a convenient VESA mounting option for LCD Displays	Keep the desktop clutter-free by mounting the L300 device to the back of an LCD monitor

Hardware

Kit contents	Each L300 kit includes an access device, power supply/cord,

	NComputing vSpace software CD/license, software installation & user guide, Quick Install Guide, and VESA-compliant monitor mounting brawcket. PC, monitor, keyboard, mouse, speakers, microphone, and
Size	Width: 115 mm / 4.5 inches, Depth: 115 mm / 4.5 inches, Height: 30 mm / 1.2 inches
Weight	154 g / 0.34 lbs. Shipping weight (includes power adapter, packaging, documentation, etc.): 0.77 kg / 1.7 lbs
Power Supply	12VDC power supply included (110/220 auto-switching)
Power Consumption	5W (independent of external USB devices)
LED Indicators	Power, network link, and network activity
Display Resolutions	**Normal display resolutions** **(16 or 24 bit color) @60Hz** 640x480, 800x600, 1024x768, 1280x1024, and 1600x1200 **Wide display resolutions** **(16 or 24 bit color) @60Hz,** 1280x720, 1280x800, 1360x768, 1366x768, 1440x900, 1680x1050, and 1920x1080
Monitor power-save Mode	Supports power-saving mode with VESA-compliant monitors
Networking	10/100 Mbps Switched Ethernet
Audio	12 bit stereo audio input / output via 3.5mm stereo jacks

Internal Hardware	All solid-state design. No moving parts, no fans, no local user storage. NComputing Numo System-on-Chip with embedded NComputing operating firmware (no local user OS)
Multimedia Support	Hardware-accelerated 2D graphics, hardware-accelerated video support for most media formats on stand-alone media player applications and browser based video
Data Security	No local data storage on device. USB data access controlled by user or device policy
Reliability (MTBF)	>100,000 hours (calculated using Bellcore Issue 6 TR-332, Case 2, Part I at 40° C)
Certifications	FCC Class B, CE, KCC, RoHS
Environmental	• 0 to 40 degrees Celsius • 10 to 85% relative humidity (non-condensing) • No moving parts permits use in high dust/particulate/vibration Environments
Maximum number of users per Operating System	NComputing vSpace Server permits up to 100 users per shared OS
PC Configuration	See recommended hardware configuration guide at

	ncomputing.com/support

Software

Supported Operating Systems	Microsoft Windows and Ubuntu Linux: refer to the support section at ncomputing.com/support for the latest supported versions.
User Software	NComputing vSpace Server desktop virtualization software with User eXtension Protocol (UXP)

L300 Connections

• 2 remote USB 2.0

• microphone jack

• speaker jack

• USB 1.1 for keyboard & mouse

• 10/100 ethernet

• VGA monitor

• 12v DC in

• on/off switch

Appendix H

Recommended Online Backup Service Providers:

Top 10 Data Storage List:

Porvider	**Price**	**Storage**
myPCBackup.com	**$3.95**	**Unlimited**
Justcloud.com	**$3.95**	**Unlimited**
BackupGenie	**$4.95**	**250GB**
SugarSync	**$9.99**	**60GB**
Carbonite	**$4.91**	**Unlimited**
Zip cloud	**$4.95**	**250GB**
Livedrive	**$7.95**	**Unlimited**
Box	**$9.99**	**250GB**
SOS	**$6.66**	**50GB**

Appendix I.

Dental Systems Comparisons.

	EagleSoft	Dentrix, EasyDental	MOGO	DentiMax	Planet DDS	Kodak Dental Systems (multiple software systems)	Ace Dental	MacPractice	LiveDDM	Dentisoft	CurveDental	Aerona
Cloud based	Cloud Backup	Partially	Cloud Backup	No	Yes	Yes (Windent)	No	No	No	Yes	Yes	Yes
Integrated scheduling	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Website integration for scheduling and availability	No	Yes	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Website integration for client forms / records	No	Yes	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Website integration for full client access to health records	No	No	No	No	Yes	No	No	No	No	Yes	No	Yes
Call log (including appt made ratio/conversion rate)	No	No	No	No	No	No	No	No	No	No	No	No
Client profitability tracking	No	No	No	No	No	No	No	No	No	No	No	No
Time in seat measurement	No	No	No	No	No	No	No	No	No	No	No	No
Referrals tracking	No	No	Yes	No	No	No	No	No	No	No	No	No
Patient history	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dental imaging	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Metrics throughout the system	Few	Few	Few	No	Few	Yes	Few	Few	No	Few	No	No
HIPPA compliant	?	?	?	?	?	?	?	?	?	?	Yes	?

Appendix J.

IT Manager JOB DESCRIPTION

Job Title:

Information Technology Manager

Supervisor: Deputy Director

Position Summary:

This position is responsible for managing all organization technologies and providing technology support and training. Primary duties include: analyzing systems and processes, maintaining workstations and networks, designing and maintaining web NHCHC website and other web based applications.

FLSA Status: Exempt

Supervisory Responsibilities: Yes

Essential Functions and Responsibilities:

1. Maintains a thorough knowledge of the organization and adheres to all organizational standards.
2. Keeps immediate supervisor well-informed of activities and recommends corrective actions.
3. Manages and maintains Microsoft Windows applications and systems including but not limited to Windows XP, Windows 7 Pro, Windows Server 2003/2008, Microsoft Exchange, Active Directory etc.
4. Manages the acquisition, installation and maintenance of the organization's local

area network hardware/software.

5. Manages network operations to include: troubleshooting connectivity problems; installing & maintaining routers; adding/terminating users; assigning rights and access; resetting passwords; establishing e-mail addresses; assessing and reporting operational status; performing backups and restoration etc.
6. Conducts technology orientation and exit briefing for all staff; prepares technology and systems for new and existing staff.
7. Ensures technology documents/certificates such as product registrations, SSL certificates, maintenance agreements, service contracts, etc. related to technology operations and/or technology services are evaluated, updated and processed.
8. Implements, administrates and maintains databases.
9. As needed or annually, provides written technology policy guidance to all staff and patients/guest users.
10. Designs, develops and maintains web-based applications including websites and intranets. Continuously improves the organization's Web site and Intranet; adds new functionality and improves user ability to maintain without technical support.
11. Provides technical supervision of technology interns; supervises other staff as directed; annually updates technology job descriptions; completes technology staff evaluations.
12. Performs routine preventive maintenance on hardware and software.
13. Analyzes technology requirements and develops functional specifications. Conducts comparative analysis and competitive bidding when necessary.
14. Assists staff in understanding and using technology; conducts regular staff technology presentations and trainings.

15. Presents and implements technological alternatives to streamline functions and improve productivity.
16. Develops and maintains technology policies, standards and procedures manual; develops and maintains related technology checklists.
17. Responsible for troubleshooting workstations, networks, software applications, phones, copiers and other technologies.
18. Manages technology inventory to include procurement and disposal.
19. Ensures compliance with all software licensing agreements. Manages and safeguards software media and associated licenses. Tracks software versions. Maintains centralized software use log.
20. Develops annual technology goals and detailed plans for goal accomplishment.
21. Utilizes the Requirements Log System to identify and timely complete technology requirements.
22. Creates and maintains LAN/WAN maintenance logs.
23. Responsible for the discovery, mitigation and documentation of information technology risks. Responsible for the completion of monthly risk management reports.
24. Ensures networks, workstations, operating systems and software applications are operational; ensures hardware and software is patched and/or updated; ensures all analog and broadband circuits are operational in accordance with vendor specifications.
25. Ensures for the availability, continuity and security of data and information pertaining to the organization.
26. Prepares, maintains and tests a technology disaster recovery plan.

27. Manages external technology projects.
28. Participates on committees, task forces, workgroups, etc. As directed, facilitates technology meetings and user groups.
29. Develops and maintains an excellent working relationship with other organizations, ensuring the organization is well received and presented professionally and positively.
30. Respects confidentiality in discussing consumer/participant, staff, volunteer and organizational matters; also maintains confidentiality of organization, project, fiscal and personnel related information.
31. Maintains knowledge on current technology by reading technology periodicals, evaluating new technologies and attending trade-shows, technical seminars and training sessions.
32. Prepares reports for workshops, seminars, conferences, meetings and trainings attended pertinent to the efficient dispatch of duties; overnight travel occasionally required.
33. Reports to work regularly and on time.
34. Assists in other duties as needed and directed.

General Competencies Required:

Intellectual:

i. demonstrates attention to detail

ii. identifies and resolves problems in a timely manner

iii. gathers and analyzes information skillfully

iv. develops alternative solutions

v. uses reason, even when dealing with emotional topics

vi. assesses own strengths and weaknesses

vii. displays critical/creative thinking

viii. possess necessary expertise to accomplish all tasks

ix. seeks self improvement

x. learns new skills to improve job performance

Organization:

i. conserves organizational resources

ii. shows respect and sensitivity for cultural differences

iii. promotes a harassment-free environment

iv. treats people with respect

v. strives for personal and organizational excellence

vi. inspires the trust of others

vii. works ethically and with integrity

viii. follows policies and procedures

ix. completes tasks correctly and on time

x. supports organization's goals, values, and policies

Interpersonal:

I. strives for continuous improvement and solicits customer feedback to improve

service

II. timely response to requests for information, service, and assistance

III. maintains confidentiality

IV. demonstrates a positive and productive attitude

V. displays self-control and keeps emotions under control, even under pressure

VI. remains open to others' ideas and tries new things

VII. speaks clearly; listens and gets clarification

VIII. exhibits objectivity and openness to others' views

IX. able to read and interpret written information

X. writes clearly, accurately, and concisely

Self Management:

I. completes tasks on time or notifies appropriate person with an alternate plan

II. observes safety and security procedures; reports unsafe conditions

III. displays willingness to make decisions

IV. measures self against standard of excellence

V. follows instructions and responds to management directions

VI. uses equipment and materials according to policy

VII. takes responsibility for own actions

VIII. prioritizes and plans work activities

IX. manages competing demands; uses time effectively

X. is consistently at work and on time

Leadership:

I. looks for ways to improve and promote quality; makes recommendations for improvements

II. able to deal with frequent changes, delays, or unexpected events

III. positive role model; exhibits confidence in self and others

IV. accepts responsibility; follows or exceeds organizational standards

V. demonstrates accuracy and thoroughness

VI. uses resources effectively and efficiently

VII. teaches, coaches, inspires, mentors, empowers others

VIII. anticipates and plans accordingly

IX. exhibits sound and accurate judgment and logical reasoning

X. works to improve team and organizational climate

Qualifications:

Special Licenses and/or Certificates:

None

Education and/or Experience:

Bachelor's degree from four-year college or university and two to four years related experience and/or training; or equivalent combination of education and experience.

Computer Skills:

To perform this job successfully the following computer proficiency is (are) required: Adobe Photoshop; Internet Explorer; Microsoft Access; Microsoft Excel; Microsoft Outlook; Microsoft PowerPoint; Microsoft Publisher; Microsoft Visio; Microsoft Word; See

other required technology skills and qualifications identified under "Other Skills and Qualifications".

I. **Other Skills and Qualifications:**

Ability to read, analyze and interpret general business periodicals, professional journals, technical procedures or governmental regulations. Ability to write reports, business correspondence and procedure manuals. Ability to effectively present information and respond to questions from groups of managers, clients, customers and the general public.

II. Ability to calculate figures and amounts such as discounts, interest, commissions, proportions, percentages, area, circumference and volume. Ability to apply concepts of basic algebra and geometry.

III. Ability to apply principles of logical or scientific thinking to a wide range of intellectual and practical problems. Ability to deal with nonverbal symbolism (formulas, scientific equations, graphs, musical notes, etc.,) in its most difficult phases. Ability to deal with a variety of abstract and concrete variables.

IV. Knowledge of and experience with: LANS/WANS; Windows Server Environment; Microsoft SQL Server; Microsoft Exchange; Internet Information Services; backup systems; network/workstation peripherals; print servers; firewalls, spam & antivirus hardware/software; Javascript, HTML, Cascading Style Sheets; computer hardware (replacing hard drives, hardware drivers, etc.).

Physical Demands:

I. The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

II. While performing the duties of this job, the employee is frequently required to stand. The employee is frequently required to walk. The employee is frequently required to sit. The employee is frequently required to use hands to finger, handle, or feel. The employee is frequently required to reach with hands and arms. The employee is occasionally required to climb or balance. The employee is occasionally required to stoop, kneel, crouch, or crawl. The employee is regularly required to talk or hear. The employee is occasionally required to taste or smell.

III. The employee must frequently lift and/or move up to 25 lbs and occasionally lift and/or move up to 50 lbs.

IV. Specific vision abilities required by this job include close vision, distance vision, color vision, peripheral vision, depth perception, ability to adjust focus.

Appendix K.

Proposed IT Training Schedule for NHCHC Staff.

Proposed IT Training Schedule for NHCHC.

Week 1:

Computer Basics

Introduction

- Getting to Know Computers
- Understanding Operating Systems
- Understanding Applications
- Web Apps and the Cloud

All about the Desktop Computer

- Basic Parts of a Desktop Computer
- Buttons, Sockets and Slots on a Desktop Computer
- Inside a Desktop Computer

Laptop Computers and Mobile Devices

- Laptop Computers and Netbooks
- Getting to Know Mobile Devices

Week 2:

Getting Started

- Setting Up a Computer.
- Beginning to Use Your Computer.
- Getting to Know the Operating System.
- Connecting to the Internet.

Doing More with Computers

- Computer Safety and Maintenance.
- Basic Troubleshooting Techniques.

Week 3:

Operating Systems (Windows XP and Windows 7)

Getting Started

- The Windows XP/7 Desktop.
- Launching Programs and Internet Explorer from the Start Menu.
- Getting Familiar with the Windows XP/7 Window.
- Moving and Sizing Windows.
- Customizing Operating System and Using the Control Panel

File Management

- Files, Folders, and Drives
- Using My Documents, My Computer and Windows Explorer
- Adding Shortcuts
- Using the Recycle Bin
- Searching for Files and Folders
- Managing User Accounts

Microsoft Office Fundamentals

- Microsoft word/ Excel fundamentals

Week 4:

Accessibility and Problem Solving

- Taking Advantage of Accessibility Options
- Using the Accessibility Wizard
- Using the Help and Support Center
- Using a Printer
- Using Systems Tools for Basic Maintenance

Web Skills

- Go to specified web address
- Follow link to new file
- Scroll through web page
- Use back button to return to web page
- Perform basic search in search engine
- Identify and evaluate search results
- Download and view file from webpage
- Print web page

Mastering Basic Email Skills

- Send an e-mail message
- Receive an e-mail message
- Attach a file to an e-mail
- Using MS Outlook Calendar.

Appendix L.

Recommended Preventive Maintenance Schedule for NHCHC.

Maintenance Activity	Recommended Frequency	Automatic
Scan hard disk file systems for errors	Weekly	Yes
Scan for viruses	Weekly	Yes
Clean CRT screen	Weekly	No
Defragment hard disks	Weekly	Yes
Scan for hard disk read errors	Weekly	Yes
Clean mouse	Monthly	No
Check for full hard disk volumes and remove unnecessary files	Monthly	No
Update virus definition files	Monthly	Sometimes
Check that power protection devices are still protecting the system	Quarterly	No
Check power supply fan for ventilation and dirt build-up; clean if necessary	Quarterly	No
Update emergency boot floppies	Quarterly	No
Clean floppy disk-drive internals and read/write heads	Quarterly (depending on use)	No
Check processor temperature; inspect heat sink	Annually (or whenever	No

and fan to ensure that they are working	case is opened)	
Check hard disk for temperature and vibration	Annually (or whenever case is opened)	No
Back up CMOS information	Annually	No
Clean exterior of case	Annually	No
Clean exterior of monitor	Annually	No
Check and clean interior, motherboard and expansion cards if necessary	Annually	No
Check internal connections and cables	Annually	No
Clean keyboard	Annually	No

Appendix M.

NHCHC Organizational Chart