ITANIUM

System Transformation for US-based Health Claim Adjudication

By

Gayathri Dissanayake
Dalhousie University, Halifax, Nova Scotia
B00497554
gy470240@dal.ca

Performed at

Keane Canada Inc

2000 Barrington St, Suite 300, Cogswell Tower, Halifax, NS, B3J 3K1

In partial fulfillment of the requirements of the Master of Health Informatics Program,

Dalhousie University

Report of Internship for the period May 17, 2010 - October 29, 2010

Date Submitted: December 2, 2010

Acknowledgement and Endorsement

This was a great opportunity for me to get an exposure to the industry and allowed me to use what I have learned during the MHI program. I was able to understand and bridge the gap between health care domain knowledge and information technology.

My work term with Keane was lot more than gaining experience. The attaining of knowledge, exposure to diverse technology, real life work experiences and networking are some of the many important benefits that I have gained during my work at Keane.

I take this opportunity to convey my whole heart gratitude to everyone who offered me help and guidance during my work at Keane as well as to all my teachers and coordinators who walked me through the MHI program at Dalhousie University. My heartfelt gratitude goes to Deirdre Harvey for providing me all the help, guidance and supervision during writing of this report.

Especially I am very thankful to my family for giving me the strength and support to successfully complete the MHI degree program.

This report has been written by Gayathri Dissanayake and has not received any previous academic credit at this or any other institute.

Gayathri Dissanayake

December 2, 2010

Table of Contents

Executive Summary

As a partial requirement of MHI program at Dalhousie University, the author had the opportunity to join Keane Canada Inc Halifax, Nova Scotia where the author worked for Tufts: one of the leading insurance companies in USA.

The author was involved in the Tufts ITANIUM project and did quality assurance testing. TUFTS Master is the major claim adjudication engine for Tufts and currently runs on HP9000 Unix server. The ITANIUM project is a system transformation from HP9000 Unix server (PA-Risc 32 bit processor) to a more sustainable new integrity UNIX server (64 bit processor) called ITANIUM. Lack of system support from Hewlett Packard (HP) after 12/31/2013 is main reason for this new system implementation.

To have a smooth transition during this new system implementation, there was a need to test the functionality of code running on two different servers. The ITANIUM project was divided in to two major parts according to its functionality in TUFTS Master system. TUFTS-B is the reporting system for TUFTS Master and carries more than 5,000 validations. During these TUFTS-B validations the testing team evaluated the stability of codes running on two different servers. This stage of ITANIUM project went live on August 8th2010. The new TUFTS Master reporting system is being called ITUFTS-B.

TUFTS-A is the production box which deals with real-time data and is directly connected to TUFTS Master screens. Routing claims are processed through this engine; an average over 200,000 claims is processed every week. During the TUFTS-A system transformation there are over 10,000 validation points to be checked and expected to go live on February 13th 2011.

COBOL is the coding language being used in this ITANIUM project. Author is aware of COBOL programming language is still used in the legacy applications in the business industry, despite most of the new systems are developed in languages such as Java. Hence author suggests that new business processes of this project to be developed in Java while maintaining the legacy code in COBOL.

1. Introduction

The author had the opportunity to gain hands-on experience in the industry by working with Keane Canada Inc., Halifax, Nova Scotia. Tufts, a major health insurance company based in USA, is one of Keane's business clients and the author worked for Tufts through Keane.

During this work term with Keane the author gained an increased knowledge and exposure to North American health care system, especially the health system accessibility differences between Canada and USA. The author directly experienced how technology can be utilized to provide services more effectively and efficiently in health industry.

The ITANIUM project is mainly about system transformation from HP9000 Unix server to a more sustainable integrity (ITANIUM) UNIX server. The author did quality assurance (QA) testing and tested the functionality of code running on two different servers, did screen testing and also did administrative procedures. The ITANUM project is expected to go live by February 13th 2011. The initial milestone was successfully completed and went live on August 8th 2010. Currently the ITANIUM testing team at Keane Canada, Halifax, is working hard to accomplish its major goal.

1.1. KEANE CANADA INC.

Keane is an IT consulting company based in USA. The company's founder is Mr. John Keane and it was established in 1965. Initially Keane focused in the healthcare technology sector. In 1990 the company expanded its services into software engineering, application maintenance, program management and consulting services [1]. Today Keane has become one of the leading

IT consulting companies in the world. Keane delivers services to businesses and government agencies. As of October 21, 2010 Keane became a part of Nippon Telegraph and Telephone (NTT) Data of Japan.

The company provides its services through onsite, near-shore, and offshore resources. Keane has approximately 12,000 employees worldwide [3]. The corporate headquarters is located in Boston, Massachusetts. There are two advanced development centers (ADC's) in Canada with the initial branch at Halifax, Nova Scotia and the most recent branch at Toronto, Ontario. The Keane Halifax ADC has approximately 500 employees. There is a total of 5000 Keane employees across North America. The company is committed to deliver excellence, innovation and growth towards both business and culture. Some of Keane's business clients are Morgan Stanley, Toyota, Fidelity, GM, Tufts, and Blue Cross, etc. Keane was the first company in Canada to achieve capability maturity model integration (CMMI) Level 5 (i.e. optimizing: focus on process improvement) assessment.

Keane's major services include:

- Application services
- Infrastructure services
- Business processing outsourcing

1.2. TUFTS HEALTH PLAN

The Tufts Health Plan (THP) was founded in 1979. Since 90% of Tufts' products are health maintenance organization (HMO), the company has been recognized as a non-profit

organization. Tufts mainly provides health insurance coverage to people in Massachusetts and Rhode Island. The rest of the USA Tufts membership will be provided through an affiliation with the global health services company called CIGNA (CG - Connecticut General Life Insurance Company and INA - Insurance Company of North America). The Tufts clientele exceeds over 740.000 members through a network of 90 hospitals and more than 25,000 physicians in private practice [2]. Tufts provides the full range of health coverage to individual consumers through employer groups. The company is committed to delivering outstanding quality and service to their members. With growing competition in health insurance business, Tufts continues to utilize technology in order to provide more effective and efficient care for its clients.

Tufts provides a wide range of benefits and programs to their clients. Some of them are:

- HMO – Health Maintenance Organization (90%)
- POS – Point Of Service
- PPO – Preferred Provider Organization
- Medicare – Total Health Plan
- THP Medicare preferred – Tufts health plan for seniors
  (Medicare + choice product)
- Carelink

1.2.1. TUFTS Master

TUFTS Master is the major claim adjudication engine for TUFTS. The TUFTS Master system is composed of over 30 subsystems. The system contains information on almost every aspect of

Tufts. (i.e. claims, membership, provider, benefits). On average the TUFTS Master engine processes more than 200,000 claims every week.

The TUFTS Master engine is mainly divided in to two production servers.

- TUFTS-A -- production server

The TUFTS-A server is directly connected to TUFTS master screens and daily claims are processed through this engine.

- TUFTS-B –- mainly used for reporting

The TUFTS-B system is updated once a week before and after check run and is being used for generating weekly, monthly, quarterly and annual reports.

2. Project Overview

Keane is one of the leading companies among IT consulting services and specializes in outsourcing business. In outsourcing, business client companies are not completely dependent on one service provider. So, in the chain of outsourcing business, Keane only provides some of many specialized IT consulting services for their clients.

2.1. KEANE - TUFTS affiliation

The Keane-Tufts relationship began in September 1st 2000. The initial contract was signed for seven years and has recently been renewed for another seven years. In addition to production support, user support, quality assurance (QA) testing (95%), enhancements and development for

the TUFTS Master system, Keane is mainly responsible for the TUFTS Master system maintenance. In order to fulfill this task more effectively and efficiently, Keane-Tufts team at ADC Halifax, are organized into two major groups:

- Quick response team (QRT)
- Release team (RT)

Keane is an ISO 9001:2000/TickIT & ISO 27001:2005 certified company and carries out 95% of Tufts' quality assurance testing work here at ADC Halifax.

2.2. ITANIUM project

The Tufts main health claim adjudication engine of the TUFTS Master system currently runs on an HP9000 Unix server. The HP9000 project was completed in 2006; Hewlett Packard support will end on 12/31/2013. So the new integrity (ITANIUM) server should take over all the responsibilities of the HP900 server before 12/31/2013.

The ITANIUM project is the system transformation from PA-Risc 32 bit processor (HP9000) to a more sustainable integrity 64 bit processor (ITANIUM). The initial milestone of TUFTS-B to ITUFTS-B transformation was successfully completed and went live on August 8th 2010. ITUFTS-A project expected to go live by February 13th 2011. The dedicated ITANIUM QA testing teams (i.e. code testing and screen testing teams) at ADC Halifax, worked very hard to achieve this. The QA- testing team is mainly responsible for testing the functionality/stability of code running on two different servers. The goal is to compare all the jobs run in old (HP9000) system to new ITANIUM environment to ensure the code stability in both environments. During

this project the QA testing team is responsible for checking the code stability for TUFTS-A and TUFTS-B systems:

- TUFTS-B -- over 5000 validation points (completed August 8th 2010)
- TUFTS-A – over 10,000 validation points

The TUFTS-B to ITUFTS-B validations are completed and went live on August 8th 2010. Now the Tufts reporting system functions on the new ITANIUM environment. At present the TUFTS-A to ITUFTS-A transformation is being launched and the Keane's QA testing team at ADC Halifax is working hand in hand with the client (Tufts) to implement this transformation.

2.2.1. Benefits of the ITANIUM system

Tufts is among the leading health insurance companies in USA and they continue to utilize leveraging technology to provide more effective and efficient care for their clients. By implementing this new ITANIUM server, Tufts will attain more benefits than at present. Even though the main reason for this transformation relates to the lack of support from Hewlett Packard beyond 12/31/2013, the new ITANIUM system brings various benefits to Tufts insurance. Some of them are:

- Faster performance
- Better solutions and scalability for business continuity
- Reduced costs.
- Compatibility of new integrity server with old HP9000 server

3. Quality assurance testing

All the jobs/ validation points are grouped into schedules. The master list is created by gathering all those schedules into one main list. All the jobs which are critical for the business are grouped into schedules according to their actions, importance and priority. The project coordinator or the technical leader here at ADC Halifax takes the responsibility of assigning these schedules to QA testers.

The QA testers validate their schedules by using the compare utility tool. The compare utility system is designed to work by feeding the job name or the job number to the system. The system evaluates the functionality of code running on two different servers (i.e. HP9000 and ITANIUM). At the end of the comparison the compare utility system brings back the results showing what differences are found and where they have been found. The QA testers are responsible for validating their schedules for three successful runs in the system. The outcomes could be a pass (i.e. exactly match with expected), fail (i.e. exactly opposite of expected) or AV (accepted variance- i.e. within accepted variation criteria). These conditions (i.e. pass, fail, AV) are discussed in detail during QA training.

Any failures escalate up the appropriate system hierarchy for solving the problem. Once the problem has been identified, the testing team creates DIMS (Development Issue Management System). The purpose of this specific tracking system is to standardize the methodology of logging, reporting and tracking project issues.

At the end of each day the master list is updated with all the validations done by QA testing team. This helps Keane and Tufts project managers to keep track of the project status.

4. My role at Keane

The author worked as a quality assurance tester and carried out all the key responsibilities of a QA tester in the organization. The ITANIUM QA code testing team at ADC Halifax consists of five QA testers and a tech lead. The screen testing team works in parallel and the author performed screen testing in her spare time. During this work term the author preformed professionally and demonstrated dedication and commitment in completing all work that was assigned, on time and to the highest quality.

The author demonstrated excellent team building qualities and completed a significant amount of validations to achieve the first milestone of the project. With the ITUFTS-B project completion in August 2010 the dedicated QA testing team's efforts became obvious. During the second stage the author's enthusiasm and dedication for the project was instrumental in the successful completion of the most critical schedules validations in this project. The author's work was appreciated by the Keane managers as well as the Tufts managers.(see Appendix A).

In addition to all the routine QA testing the author carried out the master list updating of all the validation work done by five testers at the end of each day. Master list updating and maintenance was considered to be administrative work and the author took the full responsibility for handling this task. The author spent her spare time helping the screen testing team at the organization.

Weekly team meetings and monthly all hands on meetings were part of routine work during this project and the author participated regularly. The author was asked to prepare for the "lunch and learn" presentation and chose to talk about ICD10. The author prepared a little brochure including most essential information about ICD10 for the team (see Appendix B).

The author chose to talk about IC10 because that is the next major project which the Keane-Tufts team will be handling in near future. USA currently uses ICD9 codes and the "US Department of Health and Human Services (HHS) proposed new code sets to be used for reporting diagnoses and procedures on health care transactions. Under the proposal, the ICD-9-CM code sets would be replaced with the ICD-10 code sets, effective October 1, 2013" retrieved from http://en.wikipedia.org/wiki/ICD on December 20th 2010. So it is very useful and important for Keane-Tufts team to get familiar with IC10.

5. Relevance to Health Informatics

This work term with Keane was a great opportunity for the author to acquire hands-on experience in the industry by applying the knowledge attained during the Master of Health Informatics (MHI) program. This work exposure gave the author the ability to understand and bridge the gap between health care domain and information technology. The author found the opportunity of joining Keane to be a priceless work experience in the industry.

Everything that the author learned during MHI program came into play during this work term with Keane. Some subject matter -- such as IT project management, networks and web, health informatics flow and standards -- played a direct role while other subject knowledge played an indirect role during this internship program.

In a company like Keane all the projects are managed and handled according to the IT project management concepts. So every aspect of the project strictly adheres to IT project management concepts. The author used the skills learned in MHI program and improved the skills in team work, good team building qualities, leadership, holding the responsibilities, etc.

Networks and web for health informatics course played a commendable role during this work term with Keane. That course gave all the core knowledge in technology for health informatics students who had the health background. The basic knowledge in core concepts of IT is indispensable for the health informatics discipline.

As the author mentioned before, some subject knowledge came into play indirectly. In the process of preparing for ICD10 talk for Tufts team at Keane, the author used the subject knowledge gained during MHI program (i.e. health informatics flow and standards and systems and issues courses).

The author found that the types of skills and knowledge being used during work will depend strictly on job description. But no matter what the job title says, all the knowledge attained during MHI program will come into play directly or indirectly.

6. Discussion of Problem

At present and after implementation of the new integrity (Itanium) system, COBOL will still remain as the coding language being used for the TUFTS Master system. Even though COBOL is a very old language (50+ years) some business legacy applications [4, 6] still use this language. “75% of all production transactions on mainframes are done using COBOL, over 60% of all Web-access data resides on mainframe, COBOL mainframes process more than 83% of all transactions worldwide, and 95% of finance and insurance data is processed with COBOL” [5, p.164; 7]. The reason for this extensive usage of COBOL in the industry pointed as “COBOL applications are, by and large, too critical and too valuable to consider replacing en masse” [6, p.19]. A significant amount of surveys show favourable responses for continuance of COBOL

language in management information system (MIS) curriculum. [5, 8, 9]. Despite of positive responses to continue COBOL language in MIS curriculums, availability of COBOL teaching in academic and non academic adult education settings are significantly reduced presently [5, 7].

7. Conclusions

On August 8th 2010 the initial milestone of ITANIUM project was successfully achieved. The Keane ADC Halifax team and the Tufts employees worked very hard to achieve the initial goal. At present the major part (TUFTS-A to ITUFTS-A) of the Tufts system transformation is being launched: Keane's QA testing team at ADC Halifax is working hand in hand with the client (Tufts) to make this transformation happen. The author completed the most vital schedules of the TUFTS-A validations during the work term with Keane.

For the dedicated ITANIUM QA testing team at ADC Halifax, success is not unrealistic because their enthusiasm, commitment and dedication are far beyond that expected. Most importantly the client, Tufts, is very impressed with what Keane does and the way Keane handles this project.

8. Recommendations

COBOL is the coding language being used here in ITANIUM project. However author feels that most of the new graduates who pass out from academic institutions have a tendency to choose programming languages such as Java. Author is aware of COBOL programming language is still used in the legacy applications in the business industry, despite most of the new systems are developed in languages such as Java. This is a challenge faced among IS hiring managers and

academic communities [9, 10]. Hence author suggests that new business processes of this project to be developed in Java while maintaining the legacy code in COBOL.

Advantages of using Java:

- Easy maintainability and enhancements with rapid business logic changes
- Openness and availability of rich tools to connect to databases and other n-tier or client/server networks systems
- Can handle database transactions in a robust way
- Easy accessibility through internet/web and other client applications.
- Scalability and portability to new upgrades
- High availability of human resource in this new technology

Disadvantages of implementing in Java:

- Implementing the entire project with new technology would take dramatic amount of time and resources.
- Cost effective in long run but initial cost is very high
- Since JAVA is an open language so the overall control will be limited

9. Closing statement

The health informatician's role is indispensable during the process of bridging the gap between health care domain and technology. Today the demand for health informatics is skyrocketing in the market. I am proud and confident to hold the position of health informatician in the industry from here onwards.

10. References

[1] Keane Canada Inc. (2010). About Keane, it services, industries and press. Retrieved from http://www.keane.com/

[2] Tufts Health Plan. (2010). About Tufts health plan and company profile. Retrieved from http://www.tuftshealthplan.com/

[3] Keane (company). (n.d.). Retrieved from Wikipedia: http://en.wikipedia.org/wiki/Keane_(company)

[4] Robert L. Glass. (1997). COBOL: IS it dying or thriving? *Journal of Systems and Software, 39(3),197-199.* doi:10.1016/S0164-1212(97)80357-3

[5] James Wenger. (2003). The future of programming languages: evidence to support a midwest university information systems curriculum. *Journal of Systems and Software, 65(2), 163-167.* doi:10.1016/S0164-1212(02)00058-4

[6] Arranga, E.C. Price, W.(2000). Fresh From Y2k, What's Next For Cobol? Software, IEEE 17(2), 16 – 20. doi:10.1109/MS.2000.841599

[7] Datamonitor. (2008). COBOL – continuing to drive value in the 21st Century: The landscape for COBOL asset ownership. (Reference Code: CYBT0006). Retrieved from http://www.microfocus.com/000/COBOL_continuing_to_drive_value_in_the_21st_Century_tcm21-23652.pdf

[8] Ronald J. Kizior, Donald Carr, Paul Halpern. (2000). Does COBOL Have a Future? Retrieved from http://proc.isecon.org/2000/126/ISECON.2000.Kizior.pdf

[9] Donald Carr, Ronald J. Kizior, "The case for continued COBOL education" IEEE Software, vol. 17, no. 2, pp. 33-36, Mar./Apr. 2000, doi:10.1109/52.841603

[10] David Wallace, Kathleen Ball, James Wolf (2000). Developing a Large Enterprise System IS Curriculum by Integrating the Traditional Mainframe and Client-Server Environments. Retrieved from http://www.iiis.org/CDs2008/CD2008SCI/SCI2008/PapersPdf/S122CS.pdf

Appendix A

- Appreciation of author's work by ITANIUM project team leaders.
- Reference letter from ITANIUM project manager Keane at ADC Halifax.
- Reference letter from ITANIUM project tech lead Keane at ADC Halifax.

Good afternoon,

This e-mail is to inform you that we are finished with testing the CIGLOAD and EDILOAD1/2/3 process. The CRs that went in over the last couple of weeks fixed all the issues and Dave and Gayathri have been validating these schedules every day this week to ensure there were no other bugs found.

The paper load, MACESSWK, still has some DIMS remaining but I'm sure they will be addressed in the coming weeks.

As some of you know, Gayathri has been working extremely hard since ITAHPA parallel started in validating these schedules and has put in a lot of early mornings and late evenings to make sure all the issues were found, documented and resolved.

Gayathri is leaving on Friday, October 29th as her family is moving to another province. I would like to thank her for her hard work and dedication on this project over the past 6 months.

Thanks,

Curtis Sanford | Keane | Senior Consultant | W. 902.422.6036x2629 | Curtis_Sanford@keane.com

Hi,

Great news on the validation of the Loads - a key milestone in our progress! Thanks Dave & Gayathri!

Gayathri, thanks so much for the extra efforts outside of normal business hours. These validations couldn't have been successfully completed without it. It's a terrific accomplishment to finish this up before you leave next week. I echo Curtis's thanks for your hard work and dedication!

Thanks,
Nancy

Nancy Smith | Keane | Sr. Principal Consultant | W. 1.617.972.9400 x2881 | Nancy_Smith@Tufts-Health.com | Nancy.Smith@Keane.com

----- Forwarded by Gayathri Dissanayake/KEANE/THP on 10/22/2010 03:06 PM -----

From: Paul Garber/THP
To: Curtis Sanford/KEANE/THP@THP
Cc: Dave Kaufman/KEANE/THP@THP, Gayathri Dissanayake/KEANE/THP@THP, Joe Komola/THP@THP, Nancy Smith/KEANE/THP@THP, Peter Bennett/KEANE/THP@THP, Patrice Devoe
Date: 10/22/2010 02:56 PM
Subject: Re: Load testing in parallel

Thanks Curtis. Good news as far as those schedules go. I'm guessing bad news has far as losing

Gayathri.

Gayathri - thanks for all your efforts. Good luck in the future.

Paul Garber | 617 972 9400 x9089 | Nextel: 617 908 4659

My compliments and congratulations on your efforts.

Jerry Nunnaley | Keane | Sr. Program Manager | Office 617.972.9400 x 2724 | Jerry_Nunnaley@Tufts-Health.com |
Jerry_Nunnaley@Keane.com

Nov 11/10

To whom it may concern

Gayathri Dissanayake during the time she worked for me, she preformed professionally and showed dedication to completing all work that was assigned, on time and to the highest quality.

If the opportunity arose I would hire Gayathri again.

If you would like to discuss further details, Please do not hesitate to call the number below,

Peter Bennett

902 223-2657

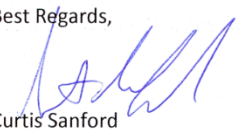
To whom it may concern;

It is my pleasure to recommend Gayathri Dissanayake to your company. I know Gayathri because I was her technical lead for the five and a half months she worked at Keane Canada Inc. in Halifax, Nova Scotia.

During her time at Keane, Gayathri helped in the migration of our client's backend claims processing system from one unix platform to another. She played a key role that allowed us to deploy one server on time and on budget and was performing exceptionally well in migrating the second server when she left Keane. Her responsibilities included script, file and report validations which were critical to ensuring the software was working properly on the new system. Over time Gayathri was entrusted with maintaining the master test plan which contained all the up to date information on what was complete and what still needed to be accomplished. This task was previously done by myself and having Gayathri step in was a very helpful and made the project more efficient. When Gayathri left her position she was maintaining the master test plan with updates on a daily basis from 8 different testers along with validating 3 major portions of the client's system.

Gayathri is a wonderful person and an extremely hard worker that will accept any challenge thrown her way. She has excelled in everything I've asked of her and always found time in her busy schedule to lend a helping hand. She is missed on a daily basis from our team and will provide your company with an employee with a strong work habit and a joy to be around.

Best Regards,



Curtis Sanford

Appendix B

- ICD10 brochure

History of ICD's

- First developed in 1893 in France by a physician, Jacques Bertillion ---- called the Bertillon Classification of Causes of Death.
- In 1898, they were adopted in the United States, and were considered, in effect, ICD-1 because that was the first version of code numbers.
- In 1949, ICD-6, was the first time mental disorders were added to the code set.
- In 1977 to ICD-9 was the first time procedure codes were added, and the CM designation was included.
- United States today use the 9th version - called **ICD-9-CM** codes.
- Since 1977 death certificates have an ICD-9 code.
- The most current list of codes in use is ICD-10.

Language Versions

ICD-10 is available in the six official languages of WHO (Arabic, Chinese, English, French, Russian and Spanish) as well as in 36 other languages

ICD Usage in USA

- This ICD 10 was first used in the United States in 2007.
- Minor revisions added to ICD-10 codes early 2009 by the NCHS.
- Globally, all most rest of the world except united states have implemented the ICD-10 codes.
- There are some major differences between the two code sets,
- ICD-11, the next major update, is projected to be ready in 2010, with expected implementation by 2015.

ICD-10

Gayathri Dissanayake
Husam Algatami

What is ICD-10 ?

It's the International Statistical Classifications of Diseases.

- ICD codes are alphanumeric
- Designations given to every diagnosis, description of symptoms and cause of death attributed to human beings.
- Up to six characters long.

Who owns it ?

ICD's are owned by The World Health Organization (WHO)

All changes and modifications to the ICD codes done by;
- National Center for Health Statistics (NCHS) - in the United States
- Centers for Medicare and Medicaid Services (CMS) - oversees with the cooperation with WHO

Some characters in ICD's

There are several lists of ICD codes. The code numbers may be the same, sometimes they will have extra numbers or letters attached to them. Examples:

- ICD-##-CM codes are used for diagnosis purposes. CM means "clinical modification." These codes are used to describe any health challenges a patient has, from his diagnosis to symptoms to outcomes from treatment, to causes of death.

- Some code sets will have extra letters addended to them to describe which country they come from. Example:

  - ICD-##-CA codes are used in Canada
  - ICD-##-AM codes are used in Australia

ICD-9

- Published by the WHO in 1977. There are 17,000 codes available in ICD-9. WHO no longer publishes or distributes the ICD-9 which is now public domain.

ICD-9-CM

- This classification is used in assigning codes to diagnoses associated with inpatient, outpatient, and physician office utilization in the U.S. Updated annually on October 1. It consists of three volumes:

  - Volumes 1 & 2 - diagnosis codes.
  - Volume 3 - procedure codes.

- It was created by the U.S. National Center for Health Statistics as an extension of ICD-9 system so that it can be used to capture more morbidity data and a section of procedure codes was added. So they are responsible for overseeing all changes and modifications to it.

ICD-10

- Work on ICD-10 began in 1983 and was completed in 1992. The code set allows more than 155,000 different codes and permits tracking of many new diagnoses and procedures, Adoption was relatively swift in most of the world. Some countries have created their version of ICD-10; Australia -"ICD-10-AM" – 1998 Canada introduced "ICD-10-CA" 2000

ICD-10-CM

- Adoption of ICD-10 has been slow in the United States. Since 1988, the USA had required ICD-9-CM codes for Medicare and Medicaid claims, and most of the rest of the American medical industry followed suit. On 1 January 1999 the ICD-10 (without clinical extensions) was adopted for reporting mortality, but ICD-9-CM was still used for morbidity. Meanwhile, NCHS received permission from the WHO to create a clinical modification of the ICD-10, and has produced these two systems:
  - ICD-10-CM, for diagnosis codes, is intended to replace volumes 1 and 2. Annual updates are provided.
  - ICD-10-PCS, for procedure codes, is intended to replace volume 3. Annual updates are provided.

Appendix C

- List of useful information

1) Massachusetts health care reform. (n.d.). Retrieved from Wikipedia: http://en.wikipedia.org/wiki/Massachusetts_health_care_reform

2) Keane company. (n.d.). Tufts Health Plan Partners with Keane to manage applications and improve operational efficiency: Leading health plan reaps benefits of near-shore application outsourcing. Retrieved from http://www.keane.com/resources%2Fpdf%2FClientSuccesses%2FKeaneUSA_TuftsHealthPlanAO_en.pdf

3) Keane company. (n.d.). Tufts Health Plan Protects Members' Identities and Privacy through Partnership with Keane: Unique Identifier Compliance. Retrieved from http://www.keane.com/resources%2Fpdf%2FClientSuccesses%2FKeaneUSA_TuftsHealthPlanUID_en.pdf

4) Keane company. (n.d.). Tufts Health Plan Partners With Keane for HIPAA Compliance Solution. Retrieved from http://www.keane.com/resources%2Fpdf%2FClientSuccesses%2FKeaneUSA_TuftsHealthPlanHIPAA_en.pdf

5) Keane company. (Version 1.0 - 2009). *THP TAHP master application Management: Introduction to Tufts.* Boston, MA.

6) Keane company. (Version 1.1 - 2010). *THP TAHP master application Management: Introduction to Tufts.* Boston, MA.

7) Keane company. (Version 1.2 - 2007). *THP TAHP master application Management: Process flow. THP TAHP master QA testing guidelines (software reliability).*Boston, MA.

8) Keane company. (Version 1.0 - 2009). *THP TAHP master application Management: Introduction to Tufts (technical).* Boston, MA.

9) Keane company. (Version 1.5 - 2007). *The application management: Team mate handbook.* Boston, MA.

10) Keane company. (2010). *TAHP master overview: Itanium project*. Keane Canada, ADC Halifax.

11) Tufts Associated Health Plans, Inc. (Rev 5 - 2007). *Development Issue Management System Procedure (DIMS).* Watertown, Ma.

12) Tufts Associated Health Plans, Inc. (Version 2 - 2010). *Itanium Upgrade Implementation: Project Charter.* Watertown, Ma.

13) Tufts Associated Health Plans, Inc. (2010). *Commercial care management; IS technical*

operations: Business training. Watertown, Ma.

14) Tufts Associated Health Plans, Inc. (2004). *Parallel test plan for The Itanium Upgrade Project – TAHPB / ITAHPB.* Watertown, Ma.

15) Tufts Associated Health Plans, Inc. (Rev 2 - 2002). *Life of a claim.* Watertown, Ma.

16) Tufts Associated Health Plans, Inc. (2010). *Itanium Upgrade Implementation: Kickoff Meeting.* Watertown, Ma.

I, Peter Bennett have reviewed this report and approve it. It accurately represents Gayathri's work at Keane. We were very pleased with Gayatrhi during her time with us and would be happy to offer her further employment at Keane should her circumstances permit.

Peter Bennett, PMP | Keane Inc. | Principal Consultant |902.422.6036 x 2424 direct | 902.223.2657 cell | Peter.Bennett@Keane.com

December 2, 2010