

Vitech-V3 Benefits Administration System

: Submitted By :

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**COLUMBIA UNIVERSITY
FU-Foundation School of Engg and Applied Science,
COMS W4910-09 Curricular Practical Training
Prof. Gail Kaiser**

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Computer Science Department
Columbia University


Curricular Practical Training Report
Coversheet

Name: Mr. Gaurav Inder Pandey

Company Name: Vitech Systems Group, Inc.

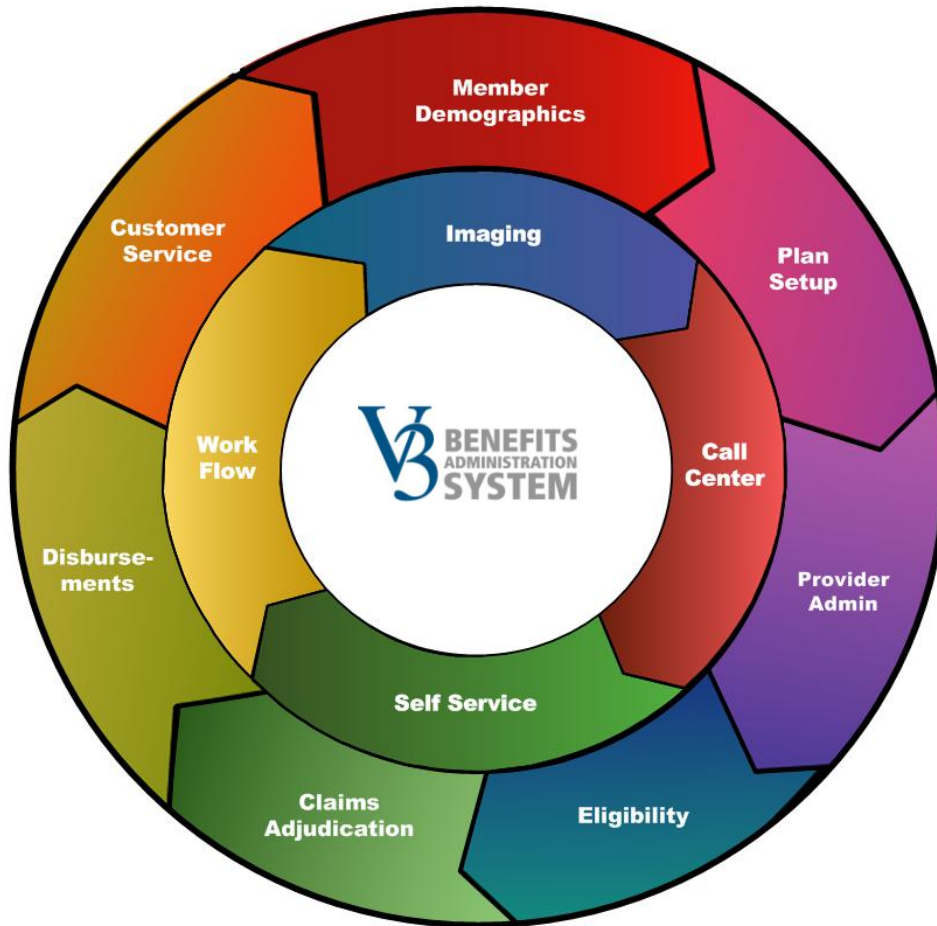
Supervisor Name: Mr. Benjamin Binford

Supervisor's Email: bbinford@vitechinc.com

Supervisor's Signature: 

Introduction

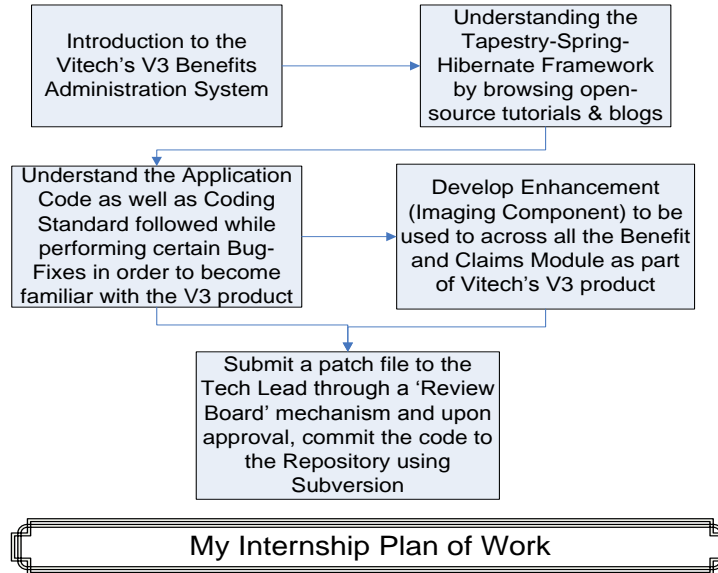
Vitech Systems Group is a leading provider of world-class software and services to the benefits administration and alternative asset communities. V3 Benefits Administration System, a product of Vitech Systems Group, Inc. is a widely installed, world-class software solution designed specifically for the needs of Public, Taft Hartley and Multiemployer benefit organizations. It is a typical ERP product which addresses the full range of core business requirements including enrollment and demographic administration, payroll reporting, contributions processing, pension calculations, health claims adjudication, benefits disbursements, and much more.



<ul style="list-style-type: none"> • V3 is a product • V3 is configured for clients • An n-tier application written in Java • Platform Neutral • Meta-data driven 	<ul style="list-style-type: none"> • Supports LOB (line of business) and Self-service applications • Same core code is deployed to all clients • Same database schema for all clients 	<ul style="list-style-type: none"> • V3 is an application platform • V3 uses patterns to build similar familiar structures across modules • V3 is growing: deeper and wider
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Planning

Vitech’s V3 product has been in constant development for the past 20 years and thus, it has become a huge product with millions of lines of code. My primary task, as an Intern in the Product Development team was to contribute to all aspects of Vitech's browser based Java product. It mainly involved routine Maintenance tasks on the V3 product along with possible Product Enhancements along the way. The V3 product comprises of several modules out of which I worked on the Benefits, Claims and CRM component. The Internship general plan can be surmised by the given flow:

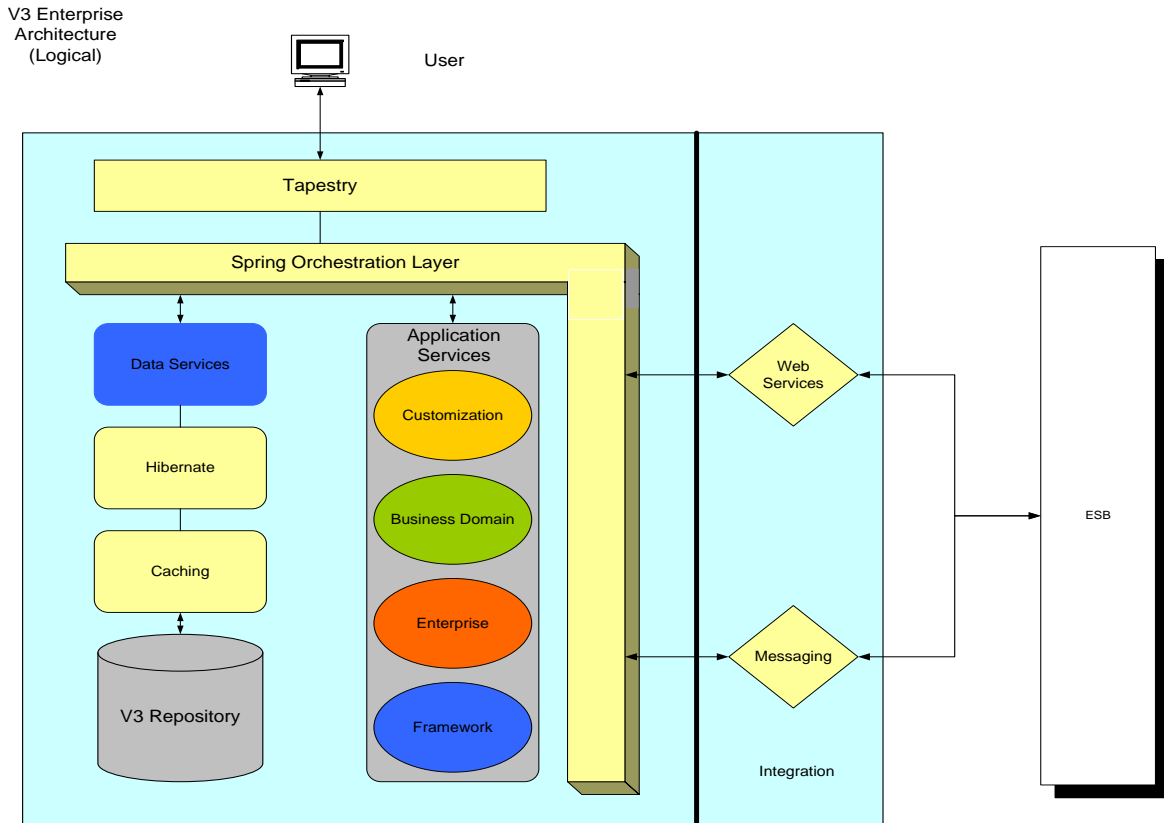


It was evident that in order to begin development, I would have to understand the system. Initial period was devoted to grasp the Tapestry-Spring-Hibernate framework basics. **Gradually, bug fixes were introduced and the complexity increased.** Finally when I became familiar, I was assigned the task to add Imaging component across all the Entities {Agreement, Audits, Billing Entity, Claims, Conference, Disbursement, Employer, Enrollment, Field Audit, and Loan Application). Imaging component would allow the User to upload Images for the specific entity based on a particular custom Image Type.




Task Name	Start	Finish
Introduction to the Vitech's V3 Product	Mon 6/29/09	Mon 6/29/09
Understand the Tapestry Framework	Tue 6/30/09	Fri 7/3/09
Understand the Sping and Hibernate	Mon 7/6/09	Tue 7/7/09
GUI issue in Employer call center screen	Wed 7/8/09	Fri 7/10/09
Button name exceeds the length of the button	Mon 7/13/09	Wed 7/15/09
Delete button enabled for a client without plans	Thu 7/16/09	Thu 7/16/09
EE clicking on save button	Fri 7/17/09	Fri 7/17/09
Exception when we click audit history button	Mon 7/20/09	Tue 7/21/09
Exception Error on click of Ok button	Wed 7/22/09	Thu 7/23/09
Upload file in image for all pages	Fri 7/24/09	Wed 8/26/09

Gantt Chart view of Internship Plan

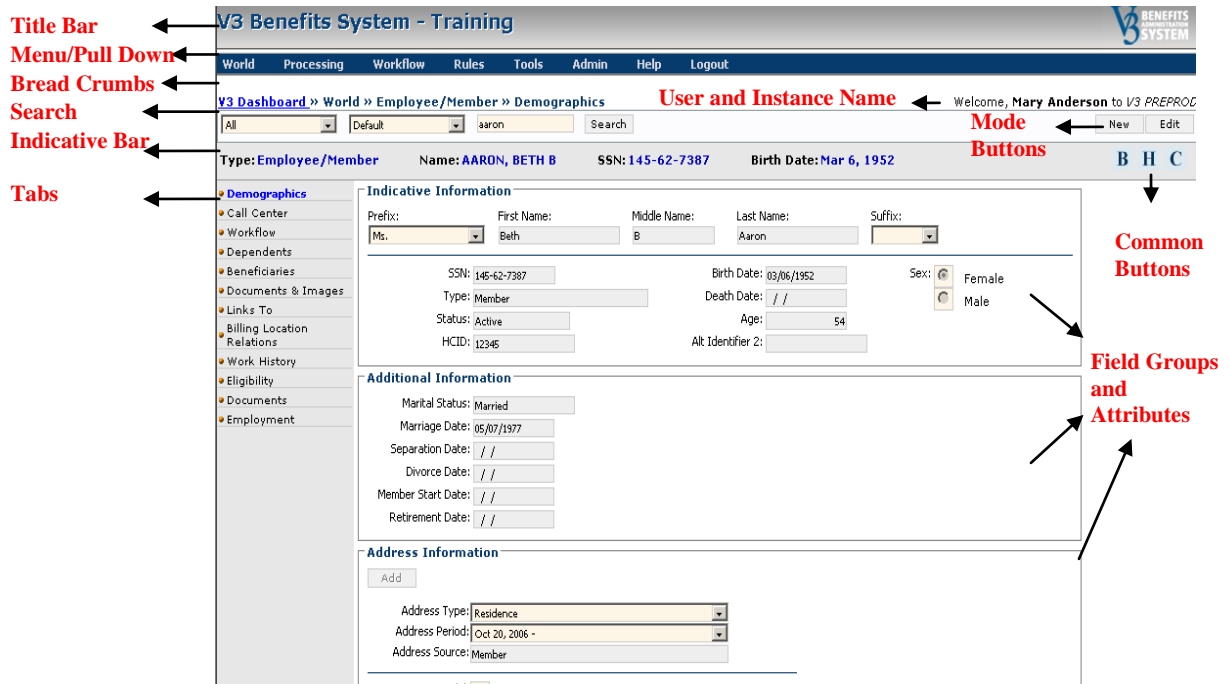
Technology Used



V3 Benefits Administration Software follows the core JEE (Java Enterprise Edition) methodology and hence, the presentation-tier is developed primarily using Apache Tapestry Framework along with Javascripts, middle-tier has been developed using Spring Framework and the Data-tier comprises of Hibernate ORM Framework used over Oracle Database. ESB (Enterprise Service Bus) uses XML as the standard communication language supporting various MEP (Message Exchange Patterns) and provides support for web-services.

 <p>tapestry</p> <p>Tapestry is an object-oriented Java web application framework to implement applications in accordance with the model-view-controller (MVC) design pattern.</p>	 <p>Hibernate uses Hibernate Query Language (HQL) which makes mapping of object-oriented domain model to a traditional relational database easier and effectively in the form of XML.</p>	 <p>Spring is an Open Source Application framework used to develop web applications on top of the Java Enterprise platform.</p>
<p>Reference – Wikipedia, Apache Foundation, SpringSource.org, Red Hat Middleware</p>		

Bug-Fixing & Enhancements performed



Vitech's V3 Product-Employee Main Page

The above figure displays the typical components constituting a Web Page in the V3 browser product. Most of my work was related to making changes in the User Interface according to the needs of the Client. 90% of the work was based on Tapestry and remaining tasks were accomplished by making use of Spring, Hibernate and underlying Stored Procedures calls.

The 6 Bug-Fix Tasks initially performed are shown below:

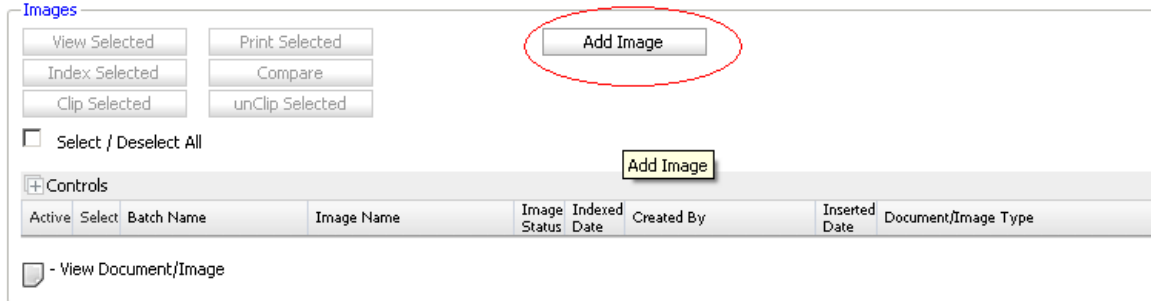
Bug Fix Task	Fix
Workflow#: 111396 GUI issue in Employer call center screen	The background color for the 'Call History Component' in global.css was overriding the background color value specified in the inboxGrid.css file and hence, two colors were being displayed in the same component.
Workflow#: 111488 Button name exceeds the length of the button	The 'title' property was created for the button in the V3Button.jwc and V3Button.java. In the UserDefinedPeriods.html, the label property specified the name as 'Generate Disb.' while the title property specified 'Generate Distribution' as a tool-tip. Corresponding dependencies were suitably modified and updated in other files.

<p>Workflow#: 111475 Delete button enabled for a client without plans</p>	<p>'isNoPensionPlans()' function was created to determine whether any Pension Plans do exist or not for a particular Pension Fund. If no Pension Plan exists, then the 'isNoPensionPlans()' returns a true value to the 'disabledDeleteButton' property and thus, the Delete button is disabled. On the other hand if Pension Plans do exist, then the 'isNoPensionPlans()' returns a false value to the 'disabledDeleteButton' property and thus, the Delete button is enabled.</p>
<p>Workflow#: 111473 EE clicking on save button</p>	<p>'isNoPensionPlans()' function was created to determine whether any Pension Plans do exist or not for a particular Pension Fund. If no Pension Plan exists, then the 'isNoPensionPlans()' returns a true value to the 'disabledEditButton' property and thus, the Edit button is disabled. On the other hand if Pension Plans do exist, then the 'isNoPensionPlans()' returns a false value to the 'disabledEditButton' property and thus, the Edit button is enabled.</p>
<p>Workflow#: 111816 Exception when we click audit history button</p>	<p>Upon debugging, it was realized that the 'getPersistentObject()' was returning a null value. The function 'getEntityAuditHistory()' returns a List. There was no specific condition to check whether the 'getPersistentObject()' is returning a null value or not and hence, the 'if ..else' conditional block was inserted in order to do so and to solve the problem</p>
<p>Workflow#: 112054 Exception Error on click of Ok button</p>	<p>The Exception error occurs when no Security User was selected while assigning at least one History Item. Modifications were made in the 'reAssignCallLog()' in order to check whether 'getSelectedSecurityUser()' returns a null value or not and an appropriate Error Message was displayed. Also, another possible bug was found in a scenario wherein a V3 User may fail to check at least one History item leading to another Exception being generated. 'getSelectedCallLogs()' was modified suitably to test whether it has null or empty characteristics and necessary changes were implemented.</p>

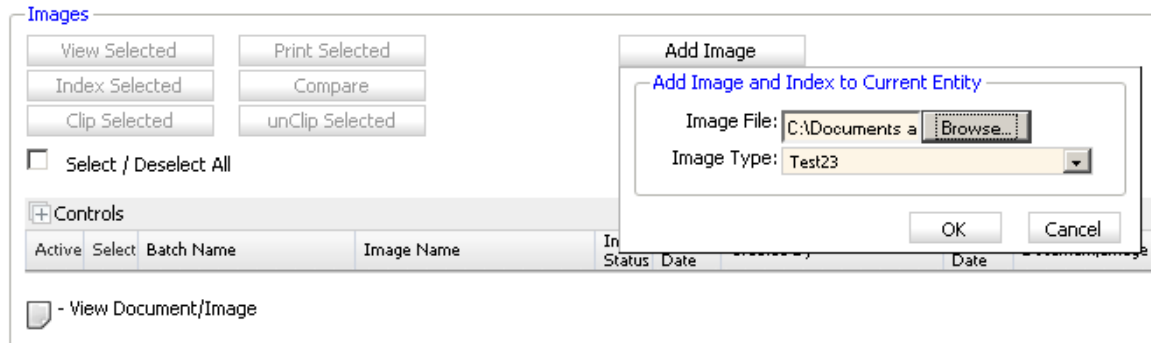
Development of Imaging Component Enhancement:

Imaging application allows the user to store scanned images and then attach them to existing business entities like members and employers. The images are often documents that members send in via mail. It involves Image Induction which is the process of importing scanned images into V3. This process copies files from a scanned location into designated V3 imaging location. It is followed by the indexing process which allows the user to associate inducted images to business entities by their unique keys like SSN, employer code.

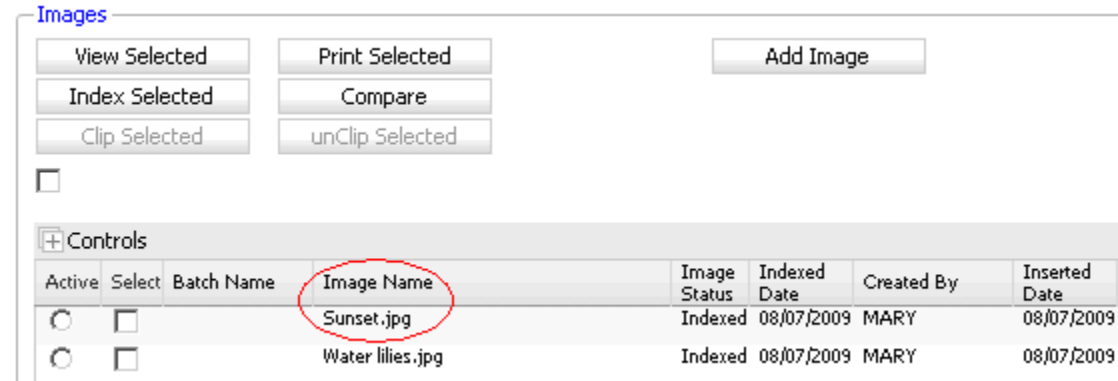
The following steps illustrate the process of adding Images to any given Entity.



All of the entity pages have an 'Images' component where in the User can upload image files as Jpeg format as shown below.



After upload of images, they appear as records with detailed information in a grid. The Images can be viewed by selecting them and clicking on the 'View Selected' button.



Steps used to develop the Imaging Component:

- Developing Imaging tables in database which stores information about images such as external storage path since they are saved in a folder and linked through the database.
- Creation of the Imaging.hbm (hibernate file) associating an entity with image types.
- Creation of the spring_image.xml file to provide features such as ‘Inversion of Control’ and ‘Batch Processing’ to imaging module.
- Development of Java programs for uploading images, fetching entity information, associating entity information with the image as tags, saving it in database through hibernate medium.
- Implementation of the Web User Interface using Tapestry to visually represent the components.

What I learnt

- In terms of Java, I familiarized myself with the Java Enterprise Edition (Tapestry-Hibernate-Spring) framework especially Inversion of Control & Factoring services.
- More importantly, I gained experience in critically thinking about problems, the cause of exceptions as well as errors and possible solutions; a type of experience that cannot be obtained through homework assignments and problem sets.
- Regular backup of code is a very important task to be carried out by a good programmer. I realized it quite late when my hard-disk crashed and console kept flashing the error ‘Boot sector failure’ & hard-disk had to be replaced. 70% of the Imaging module was developed by that time. All of my code for Imaging Component development was lost but fortunately, I had taken regular source code printouts for my reference purpose which helped me. Recently, I started to use patch files created by Subversion as an effective backup item & save it in a portable storage for recovery.
- Finding Bugs/Exceptions is a difficult task and there are no good IDE-based debuggers for Javacripts. I had to use ‘Firebug’ to unearth bugs related to CSS and Javacripts.
- A product may break due to changes in the underlying framework. V3 works well using Tapestry 3 & Java 1.5. When run on other systems, it outputs unknown exceptions.
- I also became skilled at team-building and effective communication.

Challenges faced

- It was evident that in order to begin development, I would have to understand the system. Initial period was devoted to grasp the Tapestry-Spring-Hibernate framework.
- System was pretty complex and due to lack of effective documentation, I had to depend on my seniors to get information about particular functionality.

Future Expectations

I am continuing my internship at Vitech in the Fall 2009 semester and hoping to get similar project work which gives me opportunity to learn and grow.

References

- SUN JEE website - <http://java.sun.com/javaee/>
- Tapestry Tutorial - <http://tapestry.formos.com/nightly/tapestry5/tutorial1/index.html>