*Florida International University*

*School of Computing and Information Sciences*

CIS 4911 - Senior Capstone Project

Software Engineering Focus

Final Deliverable

Virtual Labs 3.0

Quota Store Module

Johann Henao

**Team Members**

Crystal Rivera

Johann Henao

Juan Riano

Trung Ngo

Daniel Gonzalez

**Product Owner**: Masoud Sadjadi

**Instructor**: Masoud Sadjadi

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# Abstract

*The following document covers the current Virtual Labs system and how our proposed system changes and improves it. The sprints for this release are described in detail, covering what stories were implemented and which are still pending for future releases. In addition, there is an appendix that covers the user interface, UML diagrams, and other sprint information. A glossary is also included at the end to cover specific terms relevant to our development process and the system.*

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# 1 Introduction

This section is a brief introduction to the current system and its functionalities, as well as the purpose of building a new system.

# 2 Current System

This document is geared towards the migration of the Quota Store module from Moodle MLS to eFront MLS. Nonetheless, following is a general overview of the system as a whole to provide background context which the reader can use to get a global understanding of all the pieces that make up the whole Virtual Labs solution.

The current system was developed and maintained by Dr. Sadjadi and fellow students. The in production version provides an interface through Moodle that allows students to reserve different types of resources which include virtual labs, mentoring and certificate exams. At the moment the system utilizes Moodle to host the modules but the actual virtual labs interface is hosted in an eFront platform.. This is an unnecessary hop since modules can be built within eFront itself. Also, Java applets are becoming outdated in most major browsers.

*Virtual Labs*: The main interface of Virtual Labs is built with jQueryUI and presents the user with tabs describing networking information as well as RDP sessions. At present the RDP session is established through java applets and the virtual machines are hosted on VMware. Users can tinker with the desktops without leaving the virtual labs module.

*Quota System*: The main interface of the Quota System is built with jQueryUI and smarty. This module allows an administrator to view, create, and modify policies as well as credit types. In addition, a student can view used and available quota.

*Quota Store*: Through the Quota Store, the user requests credit types (virtual labs quota) previously defined in the Quota System. Users then wait for approval of those requests from an administrator. The main interface of the Quota Store is built with jQueryUI.

*Scheduler*: The main interface of the scheduler is a JavaScript calendar, based on FullCalendar jQuery plugin, and with all the desired scheduling functionality added to it. Students can select which resource they want to reserve a time slot and schedule it on the calendar. The calendar will show the users not only their appointments but also the availability of resources to make the scheduling process easier.

*Certificate Test:* The main interface of the Certificate Test module is also built with jQueryUI. This module is very similar to Virtual Labs with an added quiz tab. Upon completion of said quiz and evaluation, specific certificates may be rewarded.

# 3 Purpose of New System

In our proposed system, the aforementioned modules will be made and hosted in eFront, eliminating all Moodle dependencies from the current system. In addition, all applets will be replaced by an HTML5 Remote Desktop Gateway called Guacamole. This will increase response time and overall performance of those tabs. In terms of UI, the proposed system will continue using jQueryUI but the latest and greatest version, updating the look to be clean and modern. Overall, the proposed system is a revamping of the current one, keeping the structure and functionality but giving it a new look and performance upgrade.

In addition to the current services provided by the current system, there will be a new module called vLabsAdmin that allows an administrator to handle the access of vLabs to certain users and to manage the database tables pertaining to the various modules

# 4 User Stories

The following section contains the user stories related to the Quota Store migration from Moodle to eFront.. These user stories were created by the product owner to be implemented in the new version of Virtual Labs and its associated modules.

There are two subsections: Implemented User Stories – which covers what user stories have been implemented, tested, and approved, and Pending User Stories – which covers what user stories have not been implemented or completed during the time allotted for this semester. Pending user stories, though not completed, will eventually be a part of the next version of the system.

## 4.1 Implemented User Stories

### User Story [#119](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/119) Learn eFront

* As a developer, I would need to learn eFront, so that I can add new vLab modules and support single sign on.

### User Story [#120](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/120) Learn WebNetwork

* As a developer, I would need to learn WebNetwork, so that I can integrate it with eFront as an eFront module with single-sign-on support.

### User Story [#122](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/122) Learn KVM

* As a developer, I would need to learn KVM, so that I can programmatically (as opposed to using its GUI-based management tool) manage and manipulate virtual machines in a pool of KVM servers.

### User Story [#154](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/154) Learn How a Module in eFront Saves/Uses Data Using a Database

* As a developer for an eFront module, I would need to know how to work with persistent data in eFront and in my own module, so that I can access the data that I may need in my module and save persistent data related to my module.

### User Story [#175](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/175) Migrate Quota Store database functionality from Moodle to Efront

* As a developer, I would like to migrate and enable the database functionalities found in the Quota Store using Efront DB wrapper functions for backend data interaction.  The scope of the work encompasses the functionality found on the following tabs:  Orders manager, Store Manager, Custom Packages, Pre-assignment.

### User Story [#179](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/179) Maintain Quota Store look and feel consistent with eFront and rest of vlabs modules.

* As a developer, I would like to keep a consistent look and feel with eFront and the rest of the vlabs modules.

### User Story [#202](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/202) Migrate Quota Store "Store Manager" tab UI functionality from Moodle to Efront.

* As a developer, I would like to be able to perform the Quota Store UI  “Store Manager” tab functions in eFront.

### User Story [#207](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/207) Automate the process of dumping and importing the data of the db for the Quota Store module.

* As a developer I would like to automate the process of dumping and importing the data of the db for the Quota Store module:
* When uninstall, all the data is dumped into a dump file before the tables are dropped - this dump file should be kept in the module or a specific location on the target machine
* On module install, if data file exists, all the data is imported after the tables are recreated
* Share results of this with Trung and Crystal

### User Story [#204](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/204) Migrate Quota Store "Pre-assignment" tab UI functionality from moodle to Efront.

* As a developer, I would like to be able to perform the Quota Store UI  “Pre-assignment” tab functions in eFront.

### User Story [#203](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/203) Migrage Quota Store "Custom Packages" tab UI functionality from moodle to Efront.

* As a developer, I would like to be able to perform the Quota Store UI  “Custom Packages” tab functions in eFront.

### User Story [#206](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/206) Implement DB referential constraints for Quota Store tables.

* Ad a developer I would like to configure DB referential constraints from moodle to Efront.

### Story [#178](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/178) Migrate Quota Store "Orders Manager" tab UI functionality from Moodle to Efront.

* As a developer, I would like to be able to perform the Quota Store UI  “Orders Manager” tab functions in eFront.

### Story [#212](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/212) Replace scripts in Shopping Cart Module with their equivalent online vesions.

* As a vLabs developer, I would like to replace some of the local scripts with their online versions so that I can minimize the space taken by my module. These scripts include jquery, jquery ui, and any other scripts that can be swapped out for an online version.

### Story [#218](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/218) Create tab with database management functionality on Quota Store.

* As the admin of eFront, I would like to be presented with an additional Database Management tab in the Quota Store,  so that I can properly install/uninstall this module.

### Story [#241](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/241) Migrate Quota Store "Shoppingcart - Store" tab UI functionality from Moodle to Efront.

* As a developer, I would like to be able to perform the Quota Store UI (User Role)  “Shoppingcart – Store -” tab functions in eFront.

### Story [#243](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/243) Migrate Quota Store "Shoppingcart - Cart" tab UI functionality from Moodle to Efront.

* As a developer, I would like to be able to perform the Quota Store UI (User Role)  “Shoppingcart – Cart -” tab functions in eFront.

### Story [#249](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/249) Change Quota Store to use Quota System user and courses table data instead of efront's.

* As a developer I would like to change the database calls that Quota Store is utilizing to get user and course information so that it pull the information from Quota System instead of efront.

## 4.2 Pending User Stories

### Story [#238](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/238) Create a database management tab in vLabsAdmin.

* As an administrator, I would like to have access to the relevant databases and data pertaining to vLabs and its various counterparts

# 5 Project Plan

The following section has two subsections: Hardware and Software Resources – which covers the software and hardware resources used in development, and Sprints Plan – which outlines each sprint. The user stories completed are listed under the appropriate sprint with the associated tasks and acceptance criteria.

## 5.1 Hardware and Software Resources

**Software:**

* **OS:** Linux
* **Web Server:** Apache 2.4
* **Persistent Data:** MySql 5.x
* **Programming Languages:** PHP, HTML, SQL, jQuery, JavaScript, CSS, Smarty.
* **Frameworks/Libraries:** eFront, jQueryUI.
* **Development/Debugging Tools:** PHPStorm, Firefox Firebug.

**Hardware:**

* **1 GB RAM**
* **40GB HDD**
* **Intel Core 2 Duo**
* **100 Mb/s nic card.**

## 5.2 Sprints Plan

## Sprint 1

(05/18/2015 - 05/29/2015)

### User Story [#119](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/119) Learn eFront

* As a developer, I would need to learn eFront, so that I can add new vLab modules and support single sign on.

**Acceptance Criteria:**

1. I can develop a hello world eFront module that works properly.
2. I can develop an eFront module that users can be automatically signed in it using their eFront credentials.
3. I can support eFront themes in my newly created eFront modules.
4. No plaintext password is required to be saved nor transit cross network to support single-sign-on modules.

### User Story [#120](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/120) Learn WebNetwork

* As a developer, I would need to learn WebNetwork, so that I can integrate it with eFront as an eFront module with single-sign-on support.

**Acceptance Criteria:**

1. I can install a WebNetwork instance that is scalable (target is 100 concurrent users).
2. I can configure the WebNetwork instance to support eFront themes and have the same look and feel.
3. I can adjust the WebNetwork instance so that it allows users to sign in programmatically (as opposed to manually via a login page) using an API (e.g., REST API, Web Services, or simple http get/post).
4. I can adjust the WebNetwork instance to support an API, if not existing already, that allows user management (create new user in WebNetwork, delete, modify, add to a group, etc.).

### User Story [#122](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/122) Learn KVM

* As a developer, I would need to learn KVM, so that I can programmatically (as opposed to using its GUI-based management tool) manage and manipulate virtual machines in a pool of KVM servers.

**Acceptance Criteria:**

1. I can install and configure KVM on a server.
2. I can create a gold image for Windows Server 8 and Windows 7 on KVM.
3. I can use KVM’s API to create new virtual machines from the previously created gold images.
4. I can use KVM’s API to start/pause/stop/restart/etc. virtual machines in a poll of KVM servers.

## Sprint 2

(06/01/2015 - 06/12/2015)

### User Story [#154](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/154) Learn How a Module in eFront Saves/Uses Data Using a Database

* As a developer for an eFront module, I would need to know how to work with persistent data in eFront and in my own module, so that I can access the data that I may need in my module and save persistent data related to my module.

**Acceptance Criteria:**

1. You have read all the eFront documentation related to this topic.
2. You know how to access and modify the data in eFront database.
3. You know how to create tables for your own module.
4. When your module is being installed/updated/uninstalled, the corresponding changes to the eFront database should be created/updated/dropped.

## Sprint 3

(06/15/2015 - 06/26/2015)

### User Story [#175](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/175) Migrate Quota Store database functionality from Moodle to Efront

* As a developer, I would like to migrate and enable the database functionalities found in the Quota Store using Efront DB wrapper functions for backend data interaction.  The scope of the work encompasses the functionality found on the following tabs:  Orders manager, Store Manager, Custom Packages, Pre-assignment.

**Acceptance Criteria:**

1. Record set is properly displayed on the above mentioned tabs within the efront shopping cart module.
2. Efront DB wrapper functions are used for all database interaction.
3. Record set navigation works as expected.

### User Story [#179](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/179) Maintain Quota Store look and feel consistent with eFront and rest of vlabs modules.

* As a developer, I would like to keep a consistent look and feel with eFront and the rest of the vlabs modules.

**Acceptance Criteria:**

1. Quota Store has the same look and feel as eFront and rest of vlabs modules.

## Sprint 4

(06/29/2015 - 07/10/2015)

### User Story [#202](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/202) Migrate Quota Store "Store Manager" tab UI functionality from Moodle to Efront.

* As a developer, I would like to be able to perform the Quota Store UI  “Store Manager” tab functions in eFront.

**Acceptance Criteria:**

1. All “Store Manager” tab functions work as expected

### User Story [#207](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/207) Automate the process of dumping and importing the data of the db for the Quota Store module.

* As a developer I would like to automate the process of dumping and importing the data of the db for the Quota Store module:
* When uninstall, all the data is dumped into a dump file before the tables are dropped - this dump file should be kept in the module or a specific location on the target machine
* On module install, if data file exists, all the data is imported after the tables are recreated
* Share results of this with Trung and Crystal

**Acceptance Criteria:**

1. Data dumping and importing on module deletion and installation respectively, work as expected.

### User Story [#204](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/204) Migrate Quota Store "Pre-assignment" tab UI functionality from moodle to Efront.

* As a developer, I would like to be able to perform the Quota Store UI  “Pre-assignment” tab functions in eFront.

**Acceptance Criteria:**

1. All “Pre-assignment” tab functionalities work as expected.

### User Story [#203](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/203) Migrage Quota Store "Custom Packages" tab UI functionality from moodle to Efront.

* As a developer, I would like to be able to perform the Quota Store UI  “Custom Packages” tab functions in eFront.

**Acceptance Criteria:**

1. All “Custom Packages” tab functionalities work as expected.

### User Story [#206](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/206) Implement DB referential constraints for Quota Store tables.

* Ad a developer I would like to configure DB referential constraints from moodle to Efront.

**Acceptance Criteria:**

1. Referential Constrains work as expected as well as delete on cascade.

### Story [#178](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/178) Migrate Quota Store "Orders Manager" tab UI functionality from Moodle to Efront.

* As a developer, I would like to be able to perform the Quota Store UI  “Orders Manager” tab functions in eFront.

**Acceptance Criteria:**

1. All “Orders Manager” tab Quota Store UI functions work as expected.

## Sprint 5

(06/13/2015 - 07/24/2015)

### Story [#212](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/212) Replace scripts in Shopping Cart Module with their equivalent online vesions.

* As a vLabs developer, I would like to replace some of the local scripts with their online versions so that I can minimize the space taken by my module. These scripts include jquery, jquery ui, and any other scripts that can be swapped out for an online version.

**Acceptance Criteria:**

1. The module should show no visual changes in appearance to the current system.
2. The module shall perform all functions that it has previously been able to do.
3. The module should be smaller than the current module.

### Story [#218](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/218) Create tab with database management functionality on Quota Store.

* As the admin of eFront, I would like to be presented with an additional Database Management tab in the Quota Store,  so that I can properly install/uninstall this module.

**Acceptance Criteria:**

The following functions are available to the admin of eFront

* 1. Import and export the Quota Store module schema.
  2. Import and export the Quota Store module data.
  3. Delete Quota Store module data.
  4. Delete Quota Store schema.

### Story [#241](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/241) Migrate Quota Store "Shoppingcart - Store" tab UI functionality from Moodle to Efront.

* As a developer, I would like to be able to perform the Quota Store UI (User Role)  “Shoppingcart – Store -” tab functions in eFront.

**Acceptance Criteria:**

1. All “Shoppingcart – Store -” tab functions work as expected.

### Story [#243](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/243) Migrate Quota Store "Shoppingcart - Cart" tab UI functionality from Moodle to Efront.

* As a developer, I would like to be able to perform the Quota Store UI (User Role)  “Shoppingcart – Cart -” tab functions in eFront.

**Acceptance Criteria:**

1. All “Shoppingcart – Cart -” tab functions work as expected.

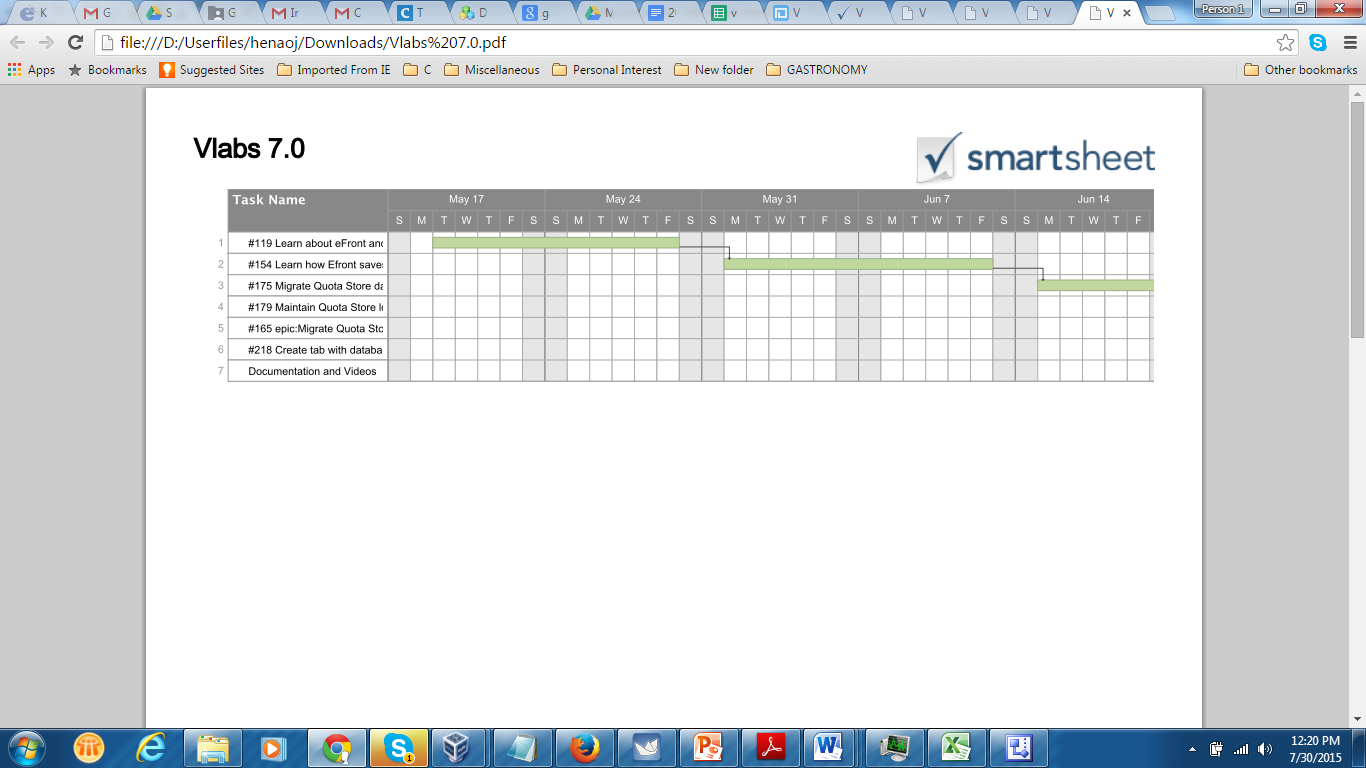
### Story [#249](https://fiu-scis-seniorproject.mingle.thoughtworks.com/projects/virtual_labs/cards/249) Change Quota Store to use Quota System user and courses table data instead of efront's.

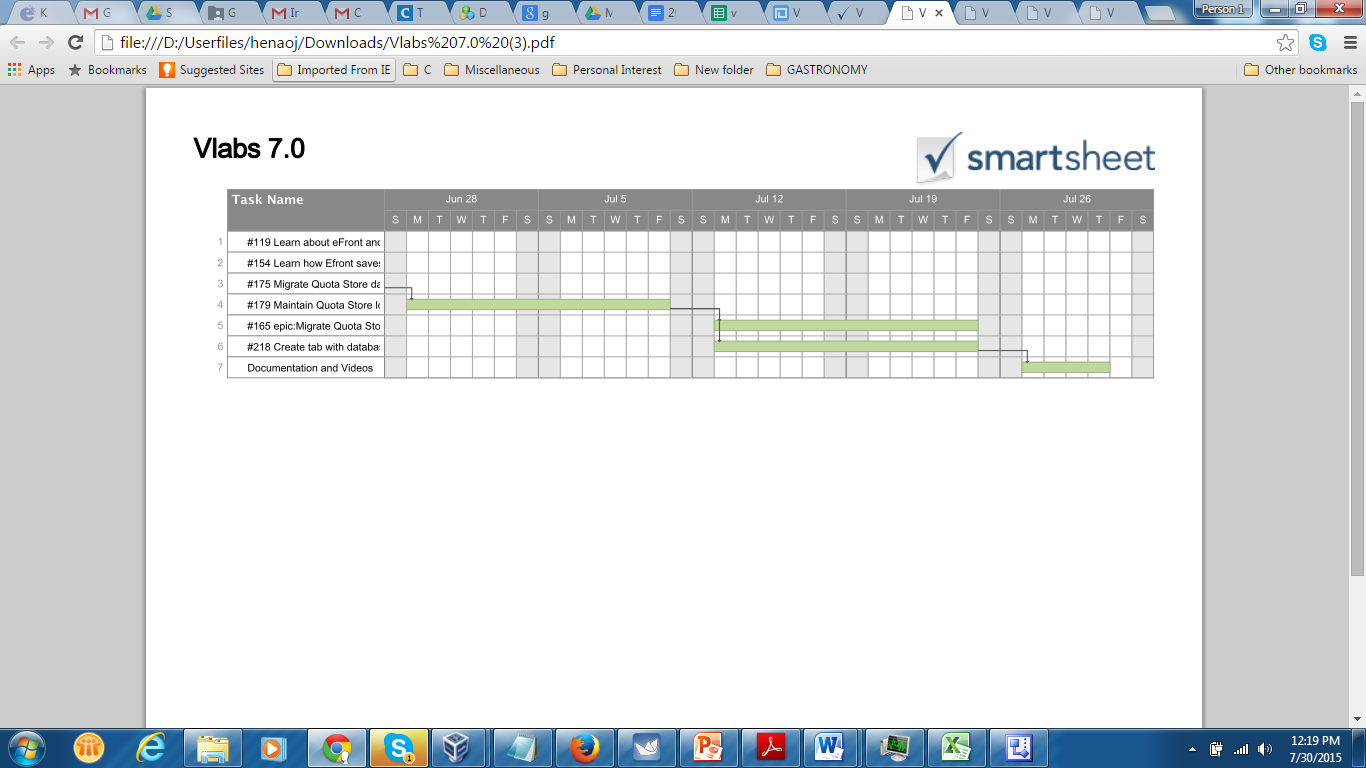
* As a developer I would like to change the database calls that Quota Store is utilizing to get user and course information so that it pull the information from Quota System instead of efront.

**Acceptance Criteria:**

1. Quota store pulls user and course information from Quota System instead of efront.
2. Regression test of the complete functionality of Quota Store works as expected.

## 5.6 Grant Chart

Figure 5.6.1 Grant chart for the Quota Store Implementation.



# 6 System Design

This section describes the architecture, system and subsystem decomposition of the Quota Store module.

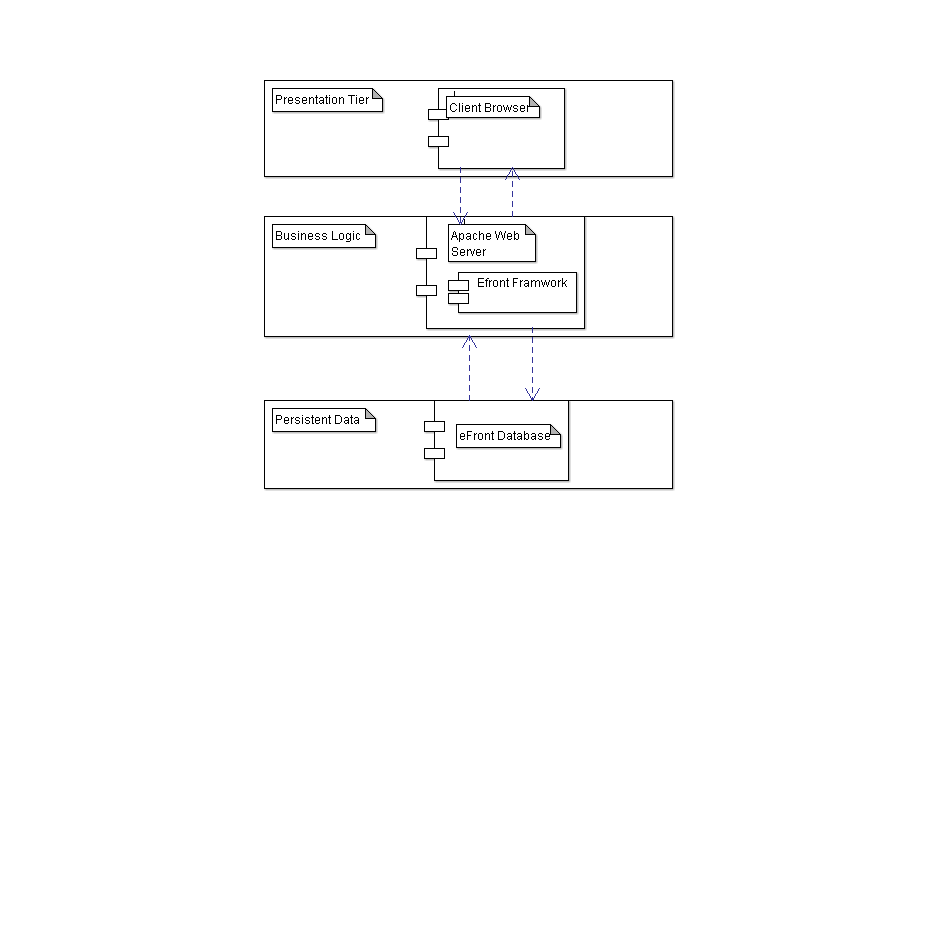
## 6.1 Architectural Patterns

Quota Store is a web solution based on a classical three tier design architecture.

## 6.2 System and Subsystem Decomposition

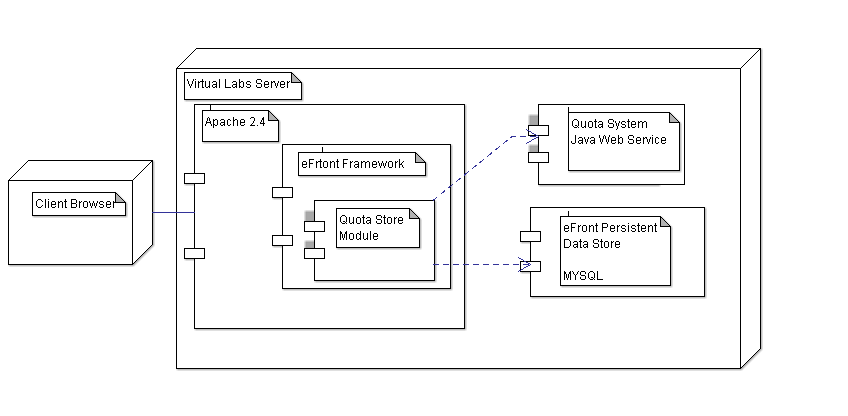
The presentation layer which is the client’s browser talks to the business layer via ajax calls. The business layer uses PHP to interact with the database layer and also uses soap calls to fetch credit type information from the quota system.

Figure 6.2.1 System and Subsystem Decomposition.



**6.3 Deployment Diagram**

Figure 6.3.1 Quota Store Deployment



**6.4 Design Patterns**

The main design patter of the Quota Store solution is the use of ajax calls to allow the client to interact with the backend data through the use of eFront DB wrapper functions. PHP is used as the main backend programming language. Also Soap calls are used to fetch credit type information from the Quota System. In addition JQuery data tables is the main look and feel of the Quota Store solution.

# 7 System Validation

* Functional tests were performed for all Use Cases of the Quota Store.
* Regression testing was performed after adding new features to the solution and/or fixing software bugs.

**Glossary**

**Ajax** – (Asynchronous JavaScript and XML) is a group of interrelated web development techniques used on the client-side to create interactive web applications. With Ajax, web applications can retrieve data from the server asynchronously in the background without interfering with the display and behavior of the existing page.

**Credit Type:** A credit type defines how to assign quota and govern the usage of basic units of resources (defined in minutes) for a specific resource (namely, virtual labs, mentors, and

certificate test virtual environment) of a specific course. In other words, a credit type is simply a tuple associating a usage policy to a resource of a course. Different quantities of a credit type can be assigned by an administrator to individual students or to all students enrolled in a course to indicate how much quota they have for using a specific resource of the course and how that quota should be used and expired over time. Note that the quota store system defines each

store item based on only one credit type. A credit type, however, may be used to define many items in the quota store, which may have different pricing types (billable or non-billable) and amounts to be used for creating different packages.

**efront** – a modern learning and training platform or virtual learning environment

**Fixed Policy**: A policy that specifies either an expiration date or a number of days relative to the purchase date of a quota in which the quota will expire.

**Gateway** – A gateway is a network point that acts as an entrance to another network.

**Gradual Policy:** A policy that defines a specific number of periods and days per period, together with the amount of quota that will expire in each of those periods.

**Guacamole** – is a HTML5 client-less remote desktop gateway

**Hypervisor** – or virtual machine monitor (VMM) is a piece of computer software, firmware or hardware that creates and runs virtual machines.

**Kernel** – a computer program that manages I/O requests from software, and translates them into data processing instructions for the CPU and other components of a computer.

**KVM** – Kernel-based Virtual Machines is a virtualization infrastructure for the Linux kernel that converts it into a hypervisor.

**Libvirt** – is a collection of software that provides a convenient way to manage virtual machines and other virtualization functionality, such as storage and network interface management. These software pieces include an API library, a daemon (libvirtd), and a command line utility (virsh).

**Quota**: The limited time (specified in minutes) that is granted to a student to allocate and make use of specific resources. If associated with a usage policy, its usage and expiration must follow the policy.

**URI** – Uniform Resource Identifiers, a string of characters used to identify a name of a resource. Libvirt uses the URI qemu:///system to connect to KVM

**Virsh** – a command line utility provided by libvirt that allows for the management of Virtual Machines

**Virtualization** – the act of making a virtual version of an operating system, computer network, or other hardware or storage devices.

**Virtual Labs** – Different virtual environment configurations designed for students to perform their lab assignments. It is composed of a collection of virtual appliances (also called virtual machines), which are connected by some virtual network components and are deployed on one or more physical machines (also called hosts).

**Virt-manager** – a GUI program offered by libvirt that allows for the management of virtual machines

**VMware** – a virtualization software.

**WSDL**: (Web Services Description Language) is an XML-based language that provides a model for describing Web services.

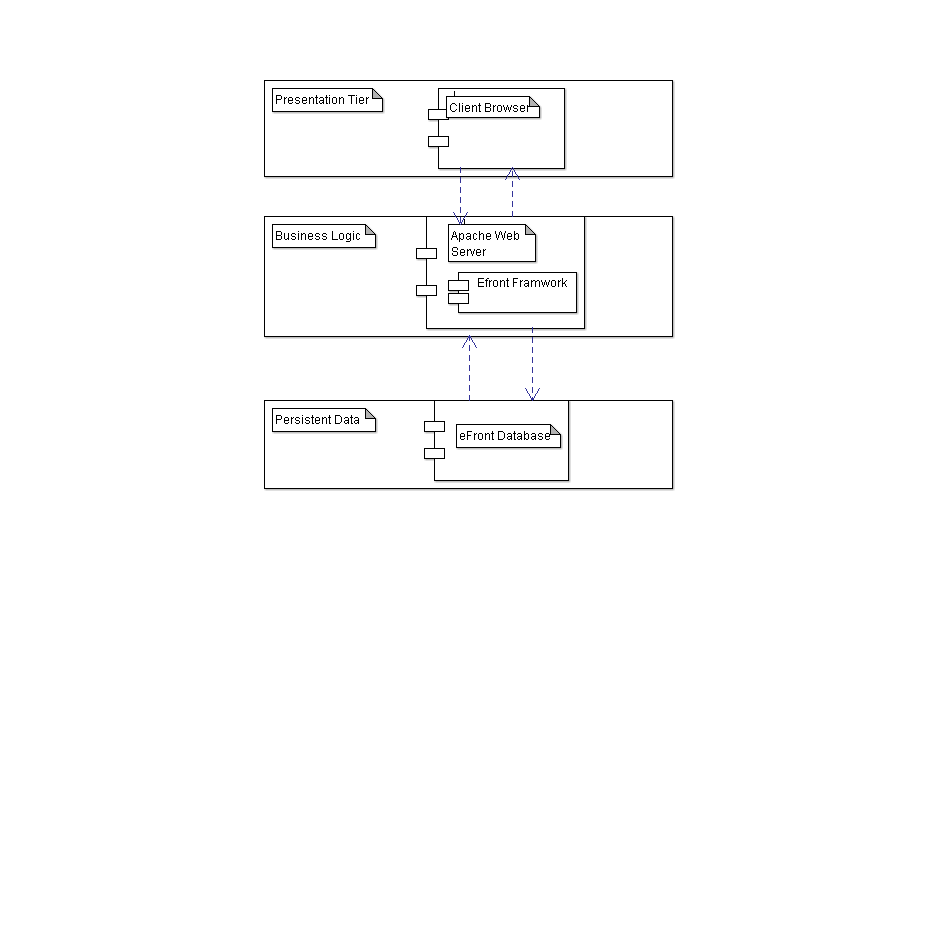
.

# 7 Appendix

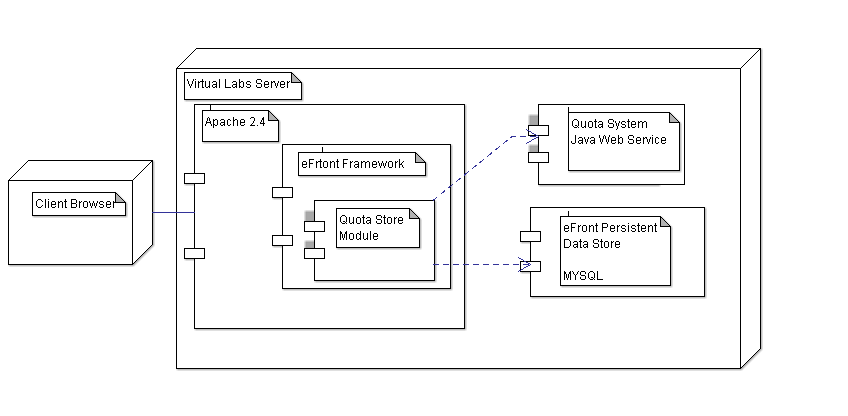
## Appendix A - UML Diagrams

## 7.1 Static UML Diagrams

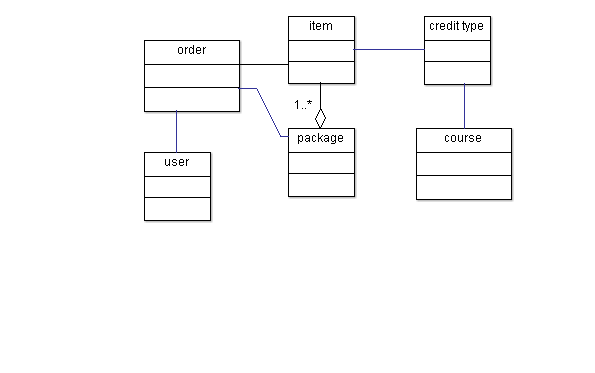
### 7.1.1 System and Subsystem decomposition



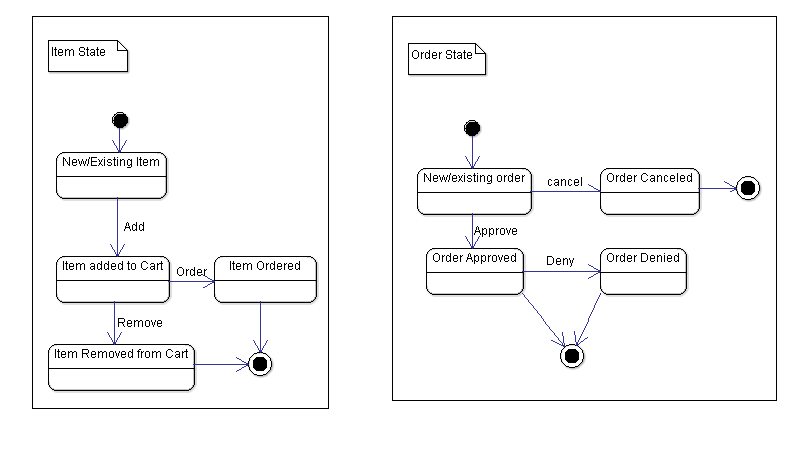
### 7.1.2 Deployment Diagram



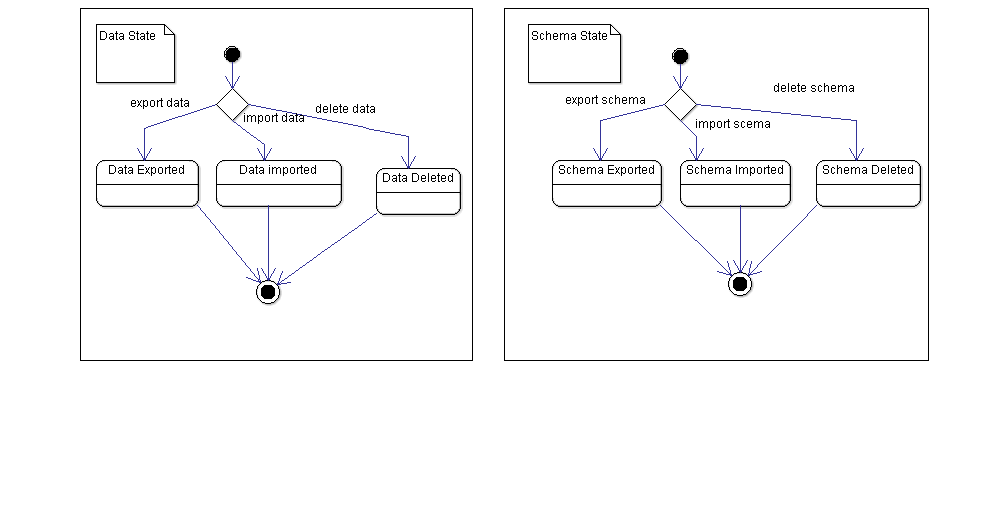
### 7.1.3 Minimal Class Diagram



### 7.1.4 State Machine Diagram



7.77



## 7.2 Dynamic UML Diagram

### 7.2.1 Use Case Diagram



### 7.2.2 Sequence Diagrams

7.2.2.1 Quota Store Use Case Diagram



7.2.2.2 Quota Store Sequence Diagram



7.2.2.3 DB Admin Sequence diagram.



# Appendix B - User Interface Design

**Virtual Labs**

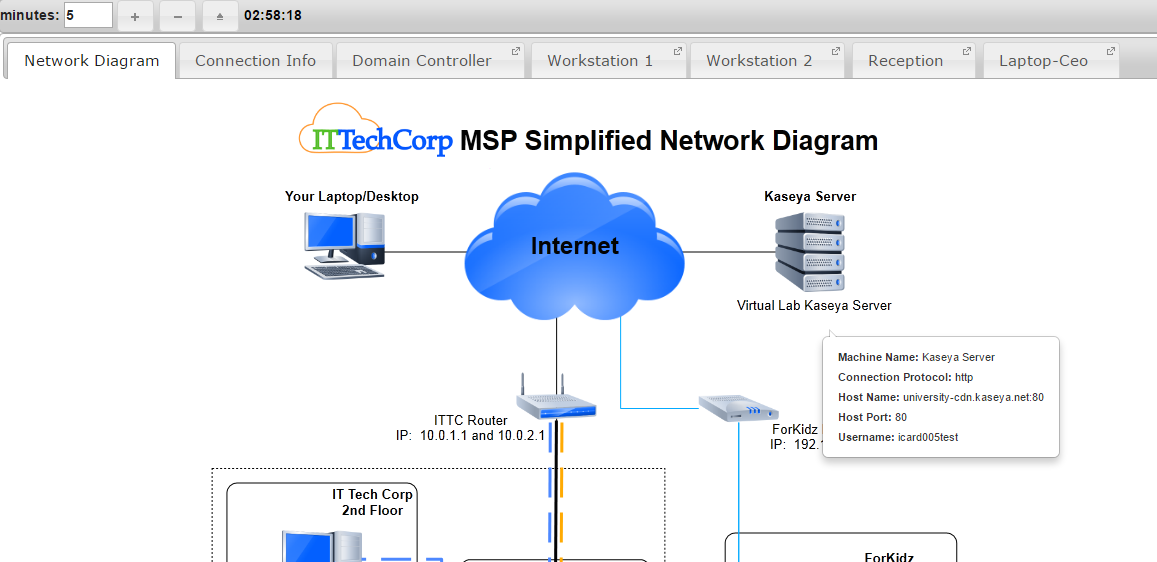


Figure 1 – New tabs layout, tooltips, and new tab icons

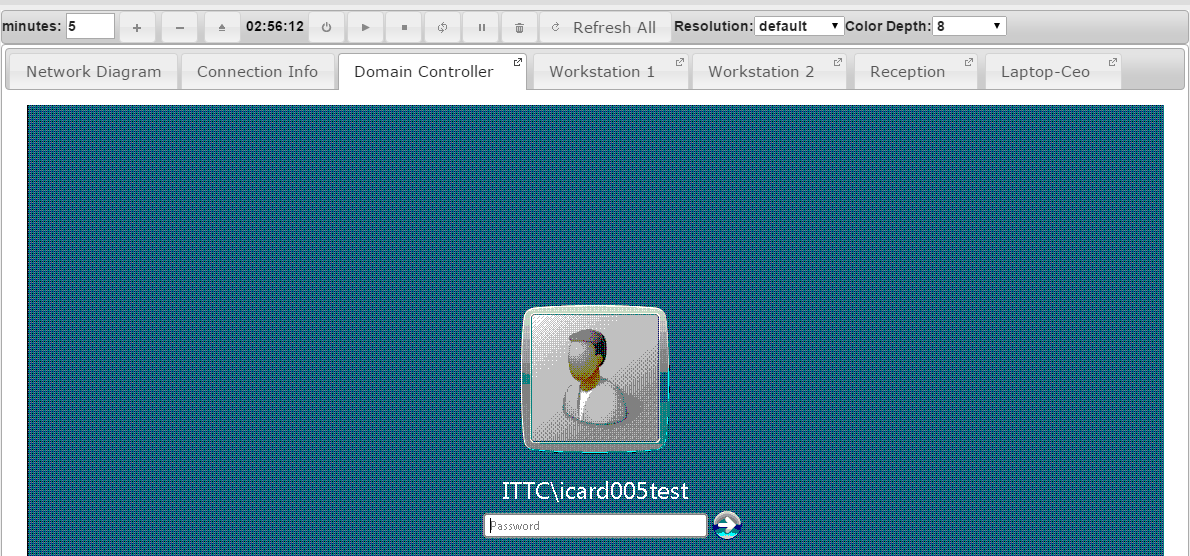


Figure 2 – RDP session is no longer by applet but by Guacamole

# Appendix C - Sprint Review Reports

**Sprint 3 Report**

**Date:** 06/26/15

**Attendees:** Crystal Rivera, Daniel Gonzalez, Johann Henao, Juan Riano, Trung Ngo

**Discussed Topics:**

First student: Crystal Rivera

* What to be done for next sprint:
  + create the user story for migrating the moodle vLabs module into eFront
  + Goal for this sprint: to get the current version of vLabs running correctly in eFront and begin applying the fixes and changes discovered through development of the other module
  + For the jQuery resources: Keep a copy of the specific version under Code/frameworks

Second student: Daniel Gonzalez

* What to be done for next sprint:
  + create the user story for finishing everything in VC12
  + create a user story for the specific conversion schedule
  + make sure all the scripts have comments
  + possibly write a script to convert all the images in vc0-vc11
  + Goal for this sprint: convert vc0-vc11 to KVM
  + Work on documenting all my notes

Third student: Johann Henao

* What to be done for next sprint:
  + Create a user story to automate the process of dumping and importing the content of the db for his module
    - when uninstall, all the data is dumped into a dump file before the tables are dropped - this dump file should be kept in the module or a specific location on the target machine
    - for install, all the data is imported after the tables are recreated
    - Share results of this with Trung and Crystal
  + Create a user story to fix db XML references
  + Create a defect story to fix the theme issue

Fourth student: Juan

* What to be done for next sprint:
  + Focus on REST and Guacamole

Fifth student: Trung Ngo

* What to be done for next sprint:
  + Create defect story for misalignment issue using efront themes.
  + Fully finish quota system and test all functionality of module.  Improve on reports user interface and fix bugs.

**Sprint 4 Report**

**Date:** 07/10/15

**Attendees:** Crystal Rivera, Daniel Gonzalez, Johann Henao, Juan Riano, Trung Ngo

**Discussed Topics:**

First student: Crystal Rivera

* What to be done for next sprint
  + Finalize vLabs Module
    - vm buttons, display parameters in url, other defects
  + Begin working on the CertTest module - should be similar to vLabs

Second student: Daniel Gonzalez

* What to be done for next sprint
  + Work on refresh script
  + Goal is to finish any remaining scripts like is\_rdp\_ready, run\_vm\_cmd, refresh\_vm

Third student: Johann Henao

* What to be done for next sprint
  + Make sure that the quota store is fully finished and tested
  + The db management tab in vLabsAdmin
    - incorporates the quota store data and the other modules as well

Fourth student: Juan

* What to be done for next sprint
  + fully document and finish the implementation of the guacamole plug in
  + fully deploy the implementation to vlabs-dev and vlabs servers
  + Investigate how we can avoid misuse of guacamole server - security
    - short sessions, timeouts, and a way of using the id so that only our own vms can be serviced by guacamole

Fifth student: Trung Ngo

* What to be done for next sprint
  + Work with Johann and Professor Sadjadi on vLabs admin tabs
  + Finish scheduler
  + Finish testing quota system
  + moving extra tabs to vlabs admin

**References**