System and Software Architecture Description (SSAD)

NICE e-commerce

Team 7

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Version History

Date	Author	Version	Changes made	Rationale
10/15/15	WRX	1.0	• Created SSAD and added section 1,2,3	• Initial draft for SSAD
11/27/15	WRX	2.0	• Updated SSAD user case until UC 15, update section 4,5	• Draft for final SSAD, not final draft
11/30/15	WRX	2.1	• Update all SSAD user cases, table index and plug-in table	• Basically finished
12/2/15	WRX	2.2	• Finished menu update	• Final version

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1. Introduction

1.1 Purpose of the SSAD

The purpose of the SSAD document is to provide the analysis of the operational concept, design the architecture, and design the implementation of the NICE e-commerce.

1.2 Status of the SSAD

The current version of the SSAD is at the Final phase. Section 4 and 5 are finished and user cases are updated compare to last version. All the components and architecture of the system to be delivered are documented.

2. System Analysis

2.1 System Analysis Overview

Nice E-commerce website is a project initiated by Eternal Wellness (the client). The final version of the project will provide an online multivendor ecommerce platform where vendors can post their products for sale and customers can buy them. Additionally, each vendor will be able to manage his own blog within the website where he can post information and market his products. PayPal covers the payment processes and Wordpress is used as the main foundation of the platform.

 System Context
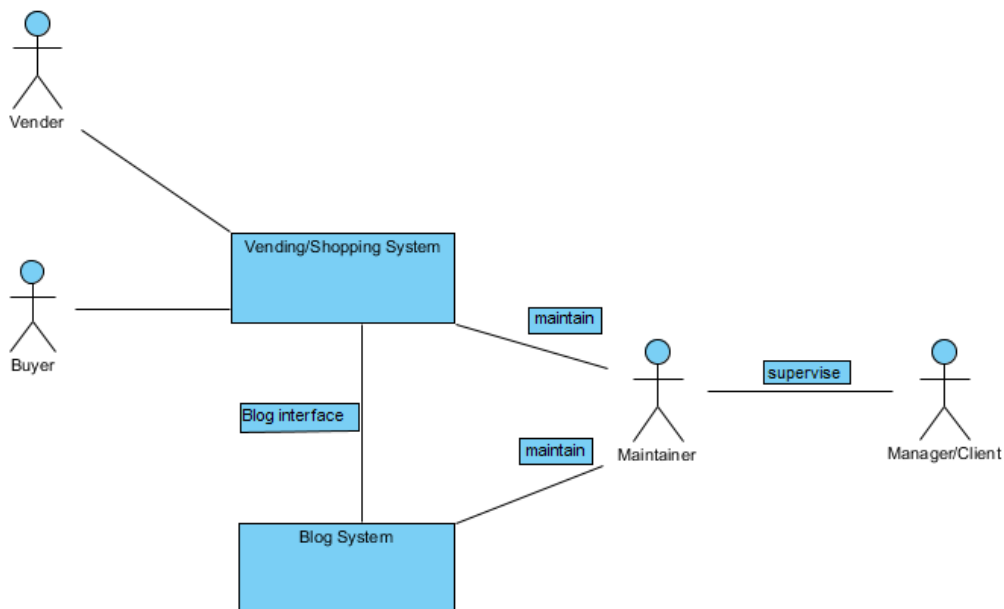
Figure 1: System Context Diagram

Table 1: Actors Summary

Actor	Description	Responsibilities
Vendor	Users that sell their products through the website	Set correct description about their products, update inventory. Post appropriate blog posts to market their products.
Buyer	Users that buy products through the website	Fill in correct information.
Maintainer	Administrators and maintainers for the website	Detect bugs and resolve reported bugs in website. Maintain database when needed. Help users with technical difficulties. Update plugins Manage home page data
Manager/Client	Website owner	Make sure the vendors are selling legal drugs. Review the website's operation result, like profit margin.
Blog System	The system for users to post and edit health kownledge.	Provide platform for communicate health knowledge

2.1.1 Artifacts & Information
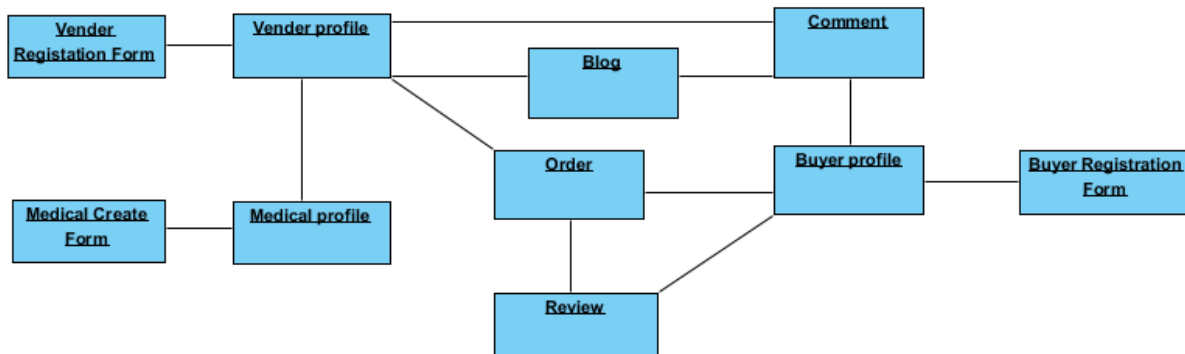
Figure 2: Artifacts and Information Diagram

Table 2: Artifacts and Information Summary

Artifact	Purpose
Vendor Registration Form	Contains information about vendor, created when the vendor registers, can be edited later
Vendor profile	Contains all information about vendor, including the products sold and blog link.
Product Creation Form	Contains new product submission required fields, search tags and media.
Product Profile	Visible by all users the profile of the product after admin approval. Contains user reviews
Comment	The comments for the blog, can be created by buyer or vendor.
Blog	Contains informational posts regarding products/marketing, the poster's information and the comments made by users.
Order	Contains the information about a purchase for one kind of item, including purchase time, purchase count and all delivery information.
Buyer profile	Contains all information for buyer, including buying history, comments in blogs and reviews for item. (generated)
Review	Reviews left for vendors for the item purchased.
Buyer Registration Form	Contains basic information for buyers, created when the buyer registered.

*(generated): generated information can be found in the diagram

2.1.2 Behavior
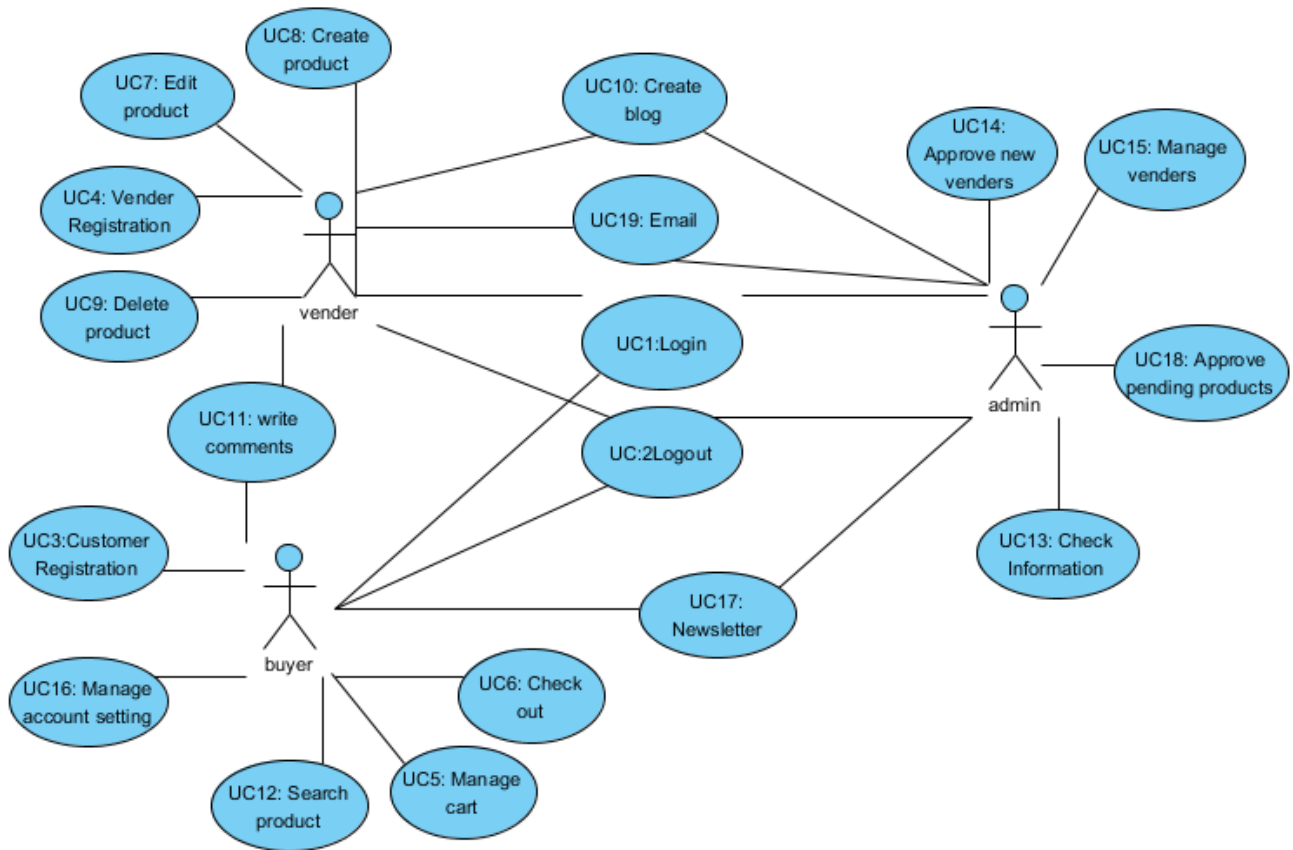
Figure 3: Process Diagram

2.1.2.1 Authentication

2.1.2.1.1 Login

Table 3: Process Description-login

Identifier	UC1 Login
Purpose	Determine if a person logging in to the system can be authenticated, and, if so, what the person's privileges are as a user of the system, i.e., what the person is authorized to do when using the system
Requirements	Authorization and Authentication
Development	None

Risks	
Pre-conditions	System database is properly initialized. User is on a computer locally connected to the NICE network. (Logging in from remote computers is not allowed.)
Post-conditions	If user is authorized s/he is given access to system operations appropriate to his/her role; otherwise, s/he is denied access to the system.

Table 4: Typical Course of Action-login: successful

Seq#	Actor's Action	System's Response
1	User enter username and password and click enter	
2		Check whether username and password is true.
3		Redirect user to user's main page

Table 5: Alternate Course of Action-login: fail

Seq#	Actor's Action	System's Response
1-2		same
3		Displays An error message: "username or password is wrong" in a dialog box

2.1.2.1.2 logout

Table 6: Process Description-logout

Identifier	UC2 Logout
Purpose	To log out of the system
Requirements	Authorization and Authentication
Risks	N/A
Pre-conditions	The user is a NICE User The user's login session still exists
Post-conditions	The user login session is terminated. The user is detached from the system

Table 7: Typical Course of Action-logout

Seq#	Actor's Action	System's Response
1	User clicks the "log out" hypertext	
2		End the session with this user and Display a message: "you have logged out of the system" in a dialog box

Table 8: Exceptional Course of Action-logout

Seq#	Actor's Action	System's Response
1	User tries to directly load logout page	
2		An error message: "you have not logged in yet".

2.1.2.2 Registration

2.1.2.2.1 Buyer registration

Table 9: Process Description-submit buyer registration

Identifier	UC- 3 Submit Application
Purpose	User register through online system, no need to register in person.
Requirements	Online application
Development Risks	None
Pre-conditions	System database is properly initialized User has loaded application page
Post-conditions	User become a registered user.

Table 10: Typical Course of Action-success registration

Seq#	Actor's Action	System's Response
1	Fill in all required data, click submit	

2		Add new user record into database
3		Redirect user to main page

<div align="center">**Table 11: Alternate Course of Action—fail registration**</div>

Seq#	Actor's Action	System's Response
1	Fill in some data, click submit	
2		Dialog in webpage "you haven't filled all information correctly"

2.1.2.2.2 Vendor registration

<div align="center">**Table 12: Process Description-submit vendor registration**</div>

Identifier	UC- 4 Vendor Registration
Purpose	Vendors register through online system, no need to register in person.
Requirements	Online application
Development Risks	None
Pre-conditions	System database is properly initialized Vendor has loaded application page
Post-conditions	Vendor becomes registered.

<div align="center">**Table 13: Typical Course of Action-success registration**</div>

Seq#	Actor's Action	System's Response
1	Fill in all required data, click submit	
2		Add new user record into database
3		Redirect user to main page

<div align="center">**Table 14: Alternate Course of Action—fail registration**</div>

Seq#	Actor's Action	System's Response
1	Fill in some data, click submit	
2		Dialog in webpage "you haven't filled all information correctly or you are not in qualified vendor list"

<div align="center">**Table 15: Alternate Course of Action—fail registration**</div>

Seq#	Actor's Action	System's Response

1	Fill in all data, not in vendor list, click submit	
2		Dialog in webpage "you haven't filled all information correctly or you are not in qualified vendor list"

2.1.2.3 Buy product

2.1.2.3.1 Add item to cart

Table 16: Process Description-add item to cart

Identifier	UC5 Manage cart
Purpose	Easier for buyer to shop, do not need to pay for each item individually
Requirements	
Development Risks	
Pre-conditions	User logged in.
Post-conditions	None

Table 17: Typical Course of Action

Seq#	Actor's Action	System's Response
1	Click "add to cart" button of the product	
2		Add the product in customer's pending buying list

2.1.2.3.2 Check out

Table 18: Process Description-check out

Identifier	UC6 check out
Purpose	Ensure safety and convenient check out for users.
Requirements	
Development Risks	
Pre-conditions	Has at least 1 item in cart
Post-conditions	Cart has 0 items and each item purchased will generate an order for buyer and vendor history

Table 19: Typical Course of Action

Seq#	Actor's Action	System's Response
1	Buyer select payment method	
2		Redirect to third party payment page with total amount
3	Finish payment	
4		Get receipt from third party payment method, clear cart item and generate orders

Table 20: Alternate Course of Action

Seq#	Actor's Action	System's Response
1-2		Same
3	Buyer did not finish payment	
4		Remain cart item

2.1.2.3.3 Edit item in cart

Table 21: Process Description-check out

Identifier	UC5 Manage cart
Purpose	Edit the quantity of item in cart
Requirements	
Development Risks	
Pre-conditions	Has at least 1 item in cart, in cart page
Post-conditions	The quantity of item is changed correctly

Table 22: Typical Course of Action

Seq#	Actor's Action	System's Response
1	Enter new quantity in the item's quantity field or click up/down button to change the quantity; then click update cart	
2		Redirect to cart page and notify user cart updated.

Table 23: Failure of Action

Seq#	Actor's Action	System's Response
1		Same
2		Redirect to cart page and notify user cart quantity cannot be updated.

2.1.2.3.4 Delete item in cart

Table 24: Process Description-check out

Identifier	UC5 Manage cart
Purpose	Delete unwanted items in cart.
Requirements	
Development Risks	
Pre-conditions	Has at least 1 item in cart, in cart page
Post-conditions	The deleted item will be removed from cart.

Table 25: Typical Course of Action

Seq#	Actor's Action	System's Response
1	Change the quantity of the item to 0 then click update.	
2		Redirect to cart page and notify user cart updated.

Table 26: Failure of Action

Seq#	Actor's Action	System's Response
1		Same
2		Redirect to cart page and notify user cart quantity cannot be updated.

2.1.2.4 Vendor Manage product

2.1.2.4.1 Edit product

Table 27: Process Description

Identifier	UC7 edit product
Purpose	Edit product information
Requirements	
Development Risks	
Pre-conditions	Product exists, vendor in product page, vendor logged in
Post-conditions	Product information edited.

Table 28: Typical Course of Action

Seq#	Actor's Action	System's Response
1	Vendor click edit button for specific product	
2		Redirect vendor to the product edit page.
3	Input new information about the product and click update.	
4		Update the new information in product page and send a dialog "Update success"

Table 29: Alternate Course of Action

Seq#	Actor's Action	System's Response
1-2	Same	same
3	Click "back" button.	
4		Redirect vendor to product list page with dialog "change unsaved"

Table 30: Exceptional Course of Action

Seq#	Actor's Action	System's Response
1-2	Same	same
3	Input invalid information and click update	
4		Dialog with "invalid information, please re-enter data"

2.1.2.4.2 Create product

Table 31: Process Description

Identifier	UC8 Create product
Purpose	Create product information
Requirements	
Development Risks	
Pre-conditions	vendor logged in
Post-conditions	New product created

Table 32: Typical Course of Action

Seq#	Actor's Action	System's Response
1	Vendor click Create button	
2		Redirect vendor to the product Create page.
3	Input new information about the product and click Create.	
4		Update the new information in product page and send a dialog "Create success"

Table 33: Alternate Course of Action

Seq#	Actor's Action	System's Response
1-2	Same	Same
3	Click "back" button.	
4		Redirect vendor to product list page with dialog "change unsaved"

Table 34: Exceptional Course of Action

Seq#	Actor's Action	System's Response
1-2	Same	Same
3	Input invalid information and click Create	
4		Dialog with "invalid information, please reenter data"

2.1.2.4.3 Delete product

Table 35: Process Description

Identifier	UC9 Delete product
Purpose	Delete product information
Requirements	
Development Risks	
Pre-conditions	vendor login
Post-conditions	Product Deleted.

Table 36: Typical Course of Action

Seq#	Actor's Action	System's Response
1	Vendor click Delete button for specific product	
2		send a dialog "Are you sure to delete this product?"
3	click "yes".	
4		send a dialog "Delete success", delete product from database

Table 37: Alternate Course of Action

Seq#	Actor's Action	System's Response
1-2	Same	same
3	Click "back" button.	
4		Redirect vendor to product list page with dialog "change unsaved"

2.1.2.5 Post blog

2.1.2.5.1 Create blog

Table 68: Process Description

Identifier	UC10 Create blog
Purpose	Delete product information
Requirements	
Development Risks	
Pre-conditions	Vendor or admin login, in blog page

Post-conditions	Product Deleted from database and the web

Table 39: Typical Course of Action

Seq#	Actor's Action	System's Response
1	Click post blog	
2		Redirect to write blog page
3	Write new blog and click post	
4		New blog is posted on website and added into database

2.1.2.5.2 Write comment

Table 40: Process Description

Identifier	UC11 write comments
Purpose	Give feedback for blogs, can from both vendor and buyer
Requirements	
Development Risks	
Pre-conditions	In blog page and already login
Post-conditions	Comment posted under blog and is added to database

Table 41: Typical Course of Action

Seq#	Actor's Action	System's Response
1	Write comments and click post	
2		Dialog "post success" and redirect to post page

Table 42: Alternate Course of Action

Seq#	Actor's Action	System's Response
1	Click post page	
2		Dialog "input must be at least 5 characters"

Table 43: Process Description

Identifier	UC11 write comments
Purpose	Give feedback for products from buyer
Requirements	

Development Risks	
Pre-conditions	Made purchase about one product
Post-conditions	New comment about the product is added

Table 44: Typical Course of Action

Seq#	Actor's Action	System's Response
1	Write comments and click post	
2		Dialog "post success" and redirect to post page

Table 45: Alternate Course of Action

Seq#	Actor's Action	System's Response
1	Click post page	
2		Dialog "input must be at least 5 characters"

2.1.2.6 Search product

2.1.2.6.1 Search product

Table 46: Process Description

Identifier	UC12 Search product
Purpose	Help customers to find what they want
Requirements	
Development Risks	
Pre-conditions	Buyer login
Post-conditions	Product matches search result show up

Table 47: Typical Course of Action

Seq#	Actor's Action	System's Response
1	Enter search name and click "search" in main page	
2		Redirect to main page with a list of product matches the result

Table 48: Alternate Course of Action

Seq#	Actor's Action	System's Response
1	Enter search name and click "search" in main page	
2		Dialog "No result can be found"

2.1.2.7 Email

2.1.2.7.1 Vendor email customer

Table 49: Process Description-vendor email customer

Identifier	UC19 Email
Purpose	To notify any abnormal about the product delivery
Requirements	
Development Risks	
Pre-conditions	Vendor logged in.
Post-conditions	User get an email from vendor

Table 50: Typical Course of Action

Seq#	Actor's Action	System's Response
1	Check email information for the customer and send the email manually	

2.1.2.7.1 Admin email vendor

Table 51: Process Description-admin email vendor

Identifier	UC19 Email
Purpose	For admin to communicate with vendor about any concerned issues.
Requirements	
Development Risks	
Pre-conditions	Admin logged in, in admin site
Post-conditions	The vendor received an email from admin

Table 52: Typical Course of Action

Seq#	Actor's Action	System's Response
1	Check email information for the customer and send the email manually	

2.1.2.7.1 Create and email newsletter

Table 53: Process Description-Create and email newsletter

Identifier	UC17 Newsletter
Purpose	For admin to create newsletter and send them to customers who subscribed newsletter.
Requirements	
Development Risks	
Pre-conditions	Admin logged in, in admin site
Post-conditions	Emails are sent to all subscribed email address.

Table 54: Typical Course of Action

Seq#	Actor's Action	System's Response
1	Click Newsletter tag	
2		Redirect admin to newsletter main page
3	Click +new	
4		Redirect admin select a new theme of newsletter
5	Select a theme	
6		Redirect to detail page of creating a newsletter
7	Fill all information required and click send through proceed to edit	
8		Notify the admin the newsletter is sent

2.1.2.7.1 Signup for newsletter

Table 55: Process Description-signup for newsletter

Identifier	UC17 Newsletter
Purpose	For customer to get new information about sales.

Requirements	
Development Risks	
Pre-conditions	None
Post-conditions	Newsletter will be sent to desired email address.

Table 56: Typical Course of Action

Seq#	Actor's Action	System's Response
1	Enter email address and click subscribe in the button of main page	
2		The email address is added to the newsletter sending list. A confirmation email should be sent to that mailbox.

2.1.2.8 Administration

2.1.2.8.1 Check order

Table 57: Process Description

Identifier	UC13 check information
Purpose	Review whether order has not been fulfilled, may notify the vendor later
Requirements	
Development Risks	
Pre-conditions	Admin login
Post-conditions	Show unshipped orders

Table 58: Typical Course of Action

Seq#	Actor's Action	System's Response
1	Click "unshipped orders"	
2		Redirect to main page with a list of unshipped orders

2.1.2.8.2 Approve new vendors

Table 59: Process Description

Identifier	UC14 approve new vendors
Purpose	Add new certified vendors in the vendor list
Requirements	
Development Risks	
Pre-conditions	Admin login
Post-conditions	New vendor added to the vendor list

Table 60: Typical Course of Action

Seq#	Actor's Action	System's Response
1	Assign a unique code, vendor's email address and Click "add vendor"	
2		Vendor's email will get the unique code for registration and the vendor will be added in vendor list

Table 61: Alternate Course of Action

Seq#	Actor's Action	System's Response
1	Assign a unique code, vendor's email address and Click "add vendor"	
2		Dialog "vendor already exists"

2.1.2.8.3 Manage account setting

Table 62: Process Description

Identifier	UC16 manage account setting
Purpose	Edit account setting
Requirements	
Development Risks	
Pre-conditions	User login, in my account page
Post-conditions	User's account setting is changed.

Table 63: Typical Course of Action

Seq#	Actor's Action	System's Response
1	Click edit button for changing specific setting	
2		Redirect user to a page for filling the new information of the specific account information.
3	Change the information and click save	
4		Notify user the new setting has been saved.

Table 64: Exception Course of Action

Seq#	Actor's Action	System's Response
1	Click edit button for changing specific setting	
2		Redirect user to a page for filling the new information of the specific account information.
3	Change the information and click save	
4		Notify user some columns are required field and must fit the format.

2.1.2.8.4 Display vendors

Table 65: Process Description

Identifier	UC13 Check information
Purpose	Monitor vendors with their sales
Requirements	
Development Risks	
Pre-conditions	Admin login
Post-conditions	Vendor's sales are displayed

Table 66: Typical Course of Action

Seq#	Actor's Action	System's Response
1	Click vendor side bar	
2		Redirect user to a vendor page with all

		vendor with their sales

2.1.2.8.1 Manage vendor

Table 67: Process Description

Identifier	UC15 Manage vendor
Purpose	Suspend vendor if necessary
Requirements	
Development Risks	
Pre-conditions	Admin login, in admin site
Post-conditions	Target vendor is suspended

Table 68: Typical Course of Action

Seq#	Actor's Action	System's Response
1	Click Users, all users tab	
2		Redirect user to a user page listed with all users
3	Move mouse on the vendor's name	
4		Edit and remove button appears
5	Click Edit	
6		Redirect to a page shows vendor details
7	Change the role in detail page from vendor and click update user	
8		Notify the admin that the user is updated

Table 69: Alter Course of Action

Seq#	Actor's Action	System's Response
1	Click Users, all users tab	
2		Redirect user to a user page listed with all users
3	Move mouse on the vendor's name	
4		Edit and remove button appears
5	Click remove	

6		Redirect to a page that ask confirmation
7	Click confirm remove	
8		Notify the admin that the vendor is removed

2.1.2.8.1 Approve pending product

Table 70: Process Description

Identifier	UC18 Approve pending product
Purpose	Make sure the new product is not illegal
Requirements	
Development Risks	
Pre-conditions	Admin login, in admin site, new products are waiting for being approved
Post-conditions	Product approved

Table 71: Typical Course of Action

Seq#	Actor's Action	System's Response
1	Click Products, products tab	
2		Redirect to all product list
3	Click pending	
4		Redirect to pending product list
5	Move mouse on the product and click quick edit	
6		Shows product details
7	Change the status from pending review to publish and click update	
8		Notify the admin that the product is updated

2.1.3 Modes of Operation

NICE e-commerce will operate in only one mode, so nothing further need be said of modes of operation.

2.2 System Analysis Rationale

Administrator registration:
     There is no registration for administrator in use case diagram because the administrator account should be built in the database by the manager. This is to prevent the administrator account to be massively created.

Vendor registration:
     There is a certified vendor list (maybe a series activation code) in database added by manager. If the vendor is on the list, he/she can continue register the vendor account.

     The payment tool will be PayPal. The debit or credit card information will not be stored in the NICE website database, they will deal with the third party payment tool directly.

3. Technology-Independent Model

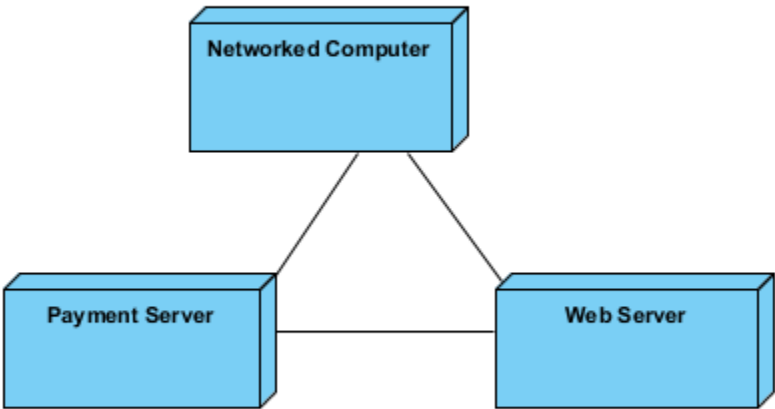## 3.1 Design Overview

3.1.1 System Structure
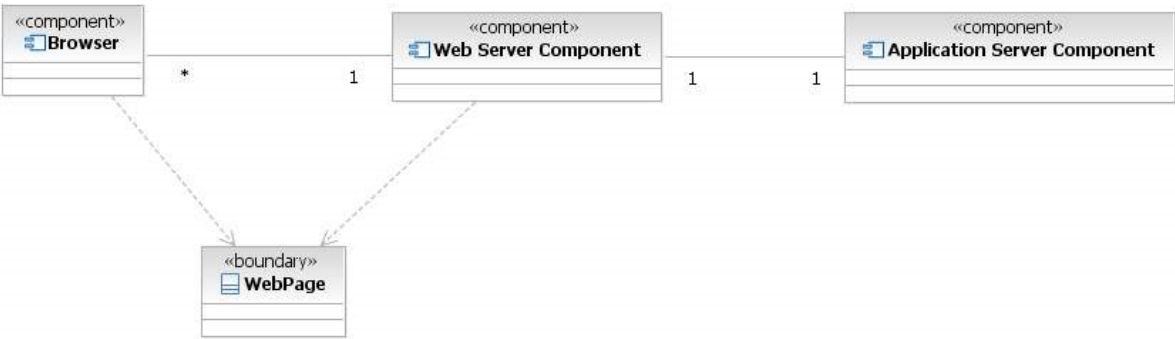

Figure 4: Hardware Component Class Diagram

Figure 5: Web Framework Component Classes

Table 72: Hardware Component Description

Hardware Component	Description

Web server	Host website and database
Payment server	Process payment
Networked computer	User's computer, process static website view

The local computer would communicate with web server payment is made. Then the local computer would communicate to payment server. After the transfer is complete, the payment server would send message to web server and redirect the user to web server.

Table 73: Web Framework Component Description

Web Component	Description
Browser	An Internet browser that connects to the NICE web application and is responsible for displaying NICE ecommerce web pages.
Web Server Component	The server component that routes all network traffic and requests between external systems and the application server.
Application Server Component	The server component where the WordPress hosts NICE website. All the logical computations are done on this component.
Web Pages	The actual web pages created by the customized WordPress.

3.1.2 Process Realization

We are an integration team and do not have many things to code in website. All the functions are realized by plug-ins. And some adjustments of code are made with plug-ins to accommodate specific requirements.

Here is a list of plug-ins:

Table 74: Plug-in Description

Duplicator	Create a backup of your WordPress files and database. Duplicate and move an entire site from one location to another in a few steps. Create a full snapshot of your site at any point in time.
Jetpack by WordPress.com	Bring the power of the WordPress.com cloud to your self-hosted WordPress. Jetpack enables you to connect your blog to a WordPress.com account to use the powerful features normally only available to WordPress.com users.

Newsletter	Newsletter is a cool plugin to create your own subscriber list, to send newsletters, to build your business.
Responsive WordPress Slider - Soliloquy Lite	Soliloquy is best responsive WordPress slider plugin. This is the lite version.
SiteOrigin CSS	An advanced CSS editor from SiteOrigin.
WC Vendors	Allow vendors to sell their own products and receive a commission for each sale.
WooCommerce	An e-commerce toolkit that helps you sell anything. Beautifully.
WooCommerce Product Archive Customiser	Allows you to customise WooCommerce product archives. Change the number of product columns and the number of products displayed per page. Toggle the display of core elements and enable some that are not included in WooCommerce core such as stock levels and product categories.
WP User Avatar	Use any image from your WordPress Media Library as a custom user avatar. Add your own Default Avatar.
YITH WooCommerce Ajax Product Filter	YITH WooCommerce Ajax Product Filter offers the perfect way to filter all the products of your shop.

3.2 Design Rationale

We are an integration team and do not have many things to code in website. All the functions are cooperating with plug-ins. All adjustments of code are made with plug-ins.
Since the integration of plug- Technology-Specific System Design

We are an integration team and do not have many things to code in website. All the functions are cooperating with plug-ins. Our custom code was mostly creating a custom theme or changing directly plugin code to accommodate client needs. This project had a huge scope and it would have taken us many man-hours to complete it potentially vastly exceeding the duration of this course. Using this compromise of Wordpress we were able to deliver all the required functionality within our allocated timeframe.

4. Architectural Styles, Patterns and Frameworks

No Frameworks were used.