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Contents

Project Overview	3
Quality Requirements	3
Platform Requirements	3
Business Rules.....	4
Use Cases.....	5
Video Conversion Process	6
Embedded Links.....	7
Video Playback Player.....	8
Searching, Tagging, and Other Requirements.....	9
Common Video Site Features.....	10
Requirement Amendments	11
Additional Requirements	11
Changed Requirements	11
Cancelled Requirements.....	11
Future Requirements	11

Project Overview

St. Pats Inc, a division of MegaSoftTech, has been contracted by Jason Pruett of Nucor-Yamato Steel to develop a software application for use on Nucor-Yamato's Intranet. This application, named NuTube, will essentially be an internal version of Google's YouTube Web Application. This project will be used to host internal videos to be embedded into a PowerPoint presentation and used as training throughout the complex. This document will cover the major functional requirements for implementing NuTube to Nucor's specifications.

The video conversion must be done automatically server side as they are uploaded with no user interaction; multiple formats should be accepted, but a common format should be stored server side for play back. The next major requirement is generating an embed link on the web page for easy linking to the video from within PowerPoint or to another user on the intranet; this should be visible and easy to use. While the application is mainly focusing on being able to embed videos in other applications and use this as a repository a user should also be able to use a video player in the browser for the Intranet site. The player should have all the major features of a common video player; it needs the ability to play, pause, and rewind, as well as the ability to see the video's time code. Searching and tagging are both features that are desirable, but are not strictly mandatory from Nucor's point of view.

Quality Requirements

The application should be designed with simplicity in mind and aimed towards non-technical users. Security is a key concern and Nucor's standard security and logging framework should be used in order to protect internal company data. Code documentation is not a requirement; readable code should be a priority and should follow the Microsoft Coding Standards for naming, legibility, and maintainability scoring. MVC4 Object oriented development will be used and the application will be separated in to separate layers for Web, Domain Models, Repository, and Business Logic or Service Layer.

Platform Requirements

The production environment for this application will be running on a Microsoft Windows 2012 server along with an instance of Microsoft SQL Server 2012 for data storage. The application will run in .NET Framework 4.0 on Entity Framework using Active Server Pages. Hardware specs are not set.

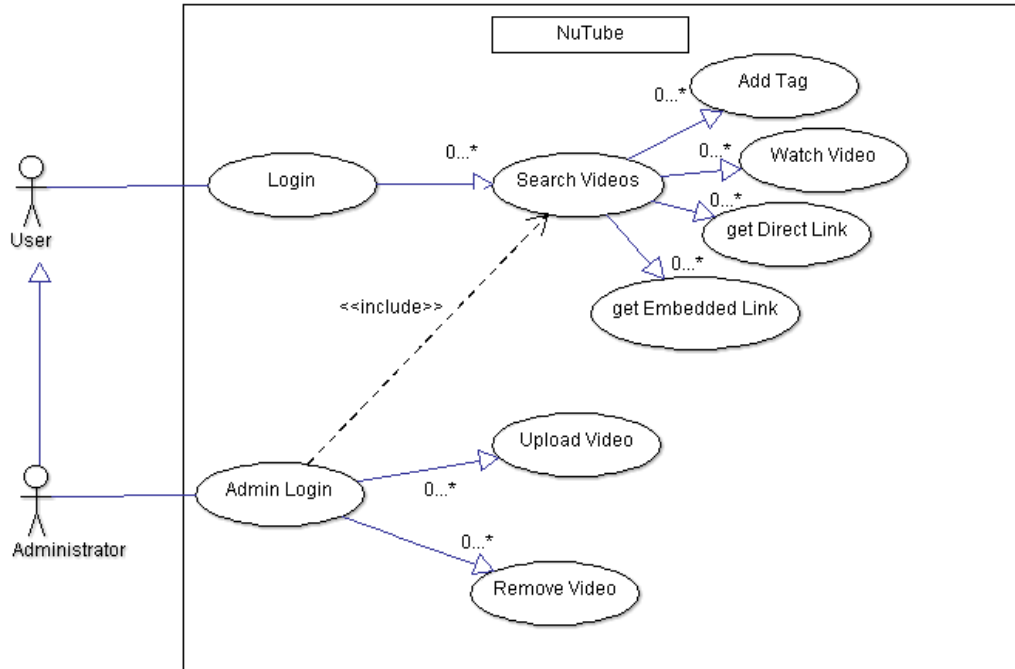
Business Rules

ID	Description	Type	Priority	Comments
BR.1	Video Conversion: All videos must be converted into a standard format for playback	Functional	Mandatory	Further description on page 6
BR.2	Embedded Links: Links must be generated on the web page that enable the user to embed the videos into PowerPoint presentations or emails to share with others	Functional	Mandatory	Further description on page 7
BR.3	Video Player: Videos must be playable in the browser with all video playback controls (play, pause, rewind) present	Functional	Mandatory	Further description on page 8
BR.4	Administrator Rights: Administrators must be able to upload and remove/archive videos from the application	Functional	Mandatory	Further description on page 5
BR.5	Tags: Users must be able to tag videos based on content	Functional	Desirable	Further description on page 9
BR.6	Searching: Users must be able to search for videos based on tags and titles	Functional	Desirable	Further description on page 9
BR.7	Related Videos: Use tags to create links between videos and link to related content on the page	Functional	Optional	Further description on page 10

Use Cases

Actors:

- User, a general employee, who would need to watch videos and/or get links from NuTube.
- Administrator, those manage and maintain, videos on NuTube.



Example Scenarios:

- Bob has a presentation of Nucor's steel manufacturing process for one of their business partners, and Bob would like to include a video. So Bob logs into his NuTube account where he searches for the tag "Steel Manufacturing", and is given a list of videos with that tag. Bob then watches a few of them in order to determine which video would be best. Bob then clicks the embed link button and adds the video of his choice to his power point.
- Fred is new to Nucor and need to learn how to change the ink in the printer, so Fred logs into his NuTube account and searches "Printer", but finds no results. Fred then attempts another search, "How To", this yields a list of videos tagged with "How To", Fred sifts through this list and find the video pertaining to changing the ink in the printer. Being a good employee, Fred adds a tag "Printer" to the video.
- Jim is an Administrator on NuTube, and needs to update the video on making coffee. Jim logs into his Admin account and selects remove video, searches for the video he wants to remove and removes it. Jim then uploads the new video and adds tags to it.

Video Conversion Process

For the NuTube project Nucor specifically said they wanted all video stored in a common format for the web player; but wanted the user to not worry at all about the format they choose to upload. From that feedback we knew that many video file types should be accepted but converted server side post upload. With the server side software running on [ASP.NET](#) we can call directly to the windows command line to run an application from the controllers HTTP Post method. E.M. Total Video Converter was chosen to handle this; it accepts many file types as the input and output and can be called via the command line with the input file directory and the output file directory as arguments as well as what the output format should be. By doing this we save a large amount of development time and do not need to reinvent the wheel while having flexibility for the user.

When a user wants to upload a file a byte stream will write the file to a temporary directory. Then the software will generate a GUID for the file name and start the conversion process. The files will be stored out of row so the database can be updated with where the processed file will be as well as the video name and other logging and tagging features. This also allows asynchronous processing where the video file can be converted while the user works on other things. Then all of the files will be dumped into their storage directories with the GUID as the file name, and the video will be available for viewing through the browser.

Embedded Links

Embedded linking is one of the most important features of the application. The user should be able to view their videos that they uploaded and also see a link to insert that video into another application; much like how Youtube allows it's videos to be inserted into other web pages. The main use of this will be that videos will be inserted into PowerPoint presentations and web pages for showing information during presentations. This allows the video to be host on an external source but referenced and always be available through the internet.

The link should be a simple copy and paste link and a button should exist on the page that will copy it to the users clip board. Though the embedding will only work inside the internal network at NuCor it is possible to use their reverse proxy system to access the videos that are stored in the repository.

Video Playback Player

We came up with three options for what we may implement for the video playback player for NuTube: Vlc.DotNet, Windows Media Player, or Silverlight. Vlc.DotNet is one of the NuGet libraries that provides the audio and video control of the VLC Media Player, and can be used with both C# and Vb.net, whereas the other two options are simply embedding a media player into the page. All three options meet the requirement of being compatible with the [asp.net](#) framework. The user would also want to be able to play videos directly on the site regardless of the device they are using (PC, smartphone, tablet, etc), without having to download the video or any specific plug-in. They should be able to play, pause/stop, control volume, and resize the video, as well as see the video's time code.

Searching, Tagging, and Other Requirements

Tagging and Searching are two of the important functional requirements that were specifically requested by Nucor. Both should closely emulate the way tagging and searching works on YouTube or other similar video hosting services in order to make users as familiar with the concepts as possible. Specifically, tagging will be done by the uploader (or a system administrator) that will allow the uploader to mark what type of content the video contains. This will make searching for similar videos easy, in case a user needs additional information about a topic. The tags will be stored in the database as described in the UML documentation. This will allow quick and easy searching and editing of tags in case of a typo or an accidental tag. The tagging feature will also allow for some easy-to-create tracking and usage metrics to go along with the application so the Nucor team has the ability to adjust the application down the line depending on what sort of usage they are seeing with the videos. Searching is another functional requirements for our project with Nucor, and while this feature isn't necessary to complete, doing so would make the application much more user friendly. The NuTube app should be able to search through videos hosted on the site by title, or tags where appropriate. This functionality will make it easier for employees using the service to find the videos they are looking for, and even find videos that may contain useful information that they weren't specifically looking for. This ability will be visible at the top of the page, like the search bar found on YouTube. It should be accessible from every page in the app, since searching for videos may be the most common things that happens within the app, with the exception of watching videos. The search box itself needs to work like the Google Chrome Browser's "OmniBox," meaning that it should search both tags and titles at the same time, making it easier on the user to find the thing they are looking for. This will likely be accomplished by doing a backend SQL search to a collection of videos that match the search term in either their title or with a particular tag that can be dropped onto the search results page. While searching isn't necessary, the combination of having searching and tagging in place for videos would allow for interesting future projects later on down the line with NuTube. Another requirement for the project is that the application be user friendly. Accounts of the level of technical prowess of the people that will be using the app do not paint the best picture, so the application needs to be as user friendly and simple as possible. Finally requirement from Nucor is to use Microsoft's Team Foundation Server as Source Control for the project. Nucor's other software development projects are all hosted on an internal Team Foundation Server and our project should be able to be included into their current source control setup to make it an easier transition from active development to maintenance. Nucor will be providing us with a way to use their internal source control in order to make this requirement significantly easier on us.

Common Video Site Features

While many of YouTube's features will be duplicated by NuTube, there are a few that will be purposefully left out. For one, there will be no comment system in NuTube. Nucor does not want to have to deal with curating a comment system that can easily turn into a place where work-inappropriate comments are made. Another feature that will be missing will be the video recommendation engine. These videos will typically be linked directly into where they need to be used, and there is no need for such a complex algorithm. However, there are features from YouTube that will be implemented, for example searching and tagging will both be implemented into NuTube and will be discussed later on. Finally, most video sites include links to Related Videos. This feature is not something that has been specifically requested by Nucor, but it would be nice to implement if there is enough time. This feature would be implemented by using the tags and video playback metrics in order to associate videos to one another and a list of videos can be dynamically generated based on the video that is currently playing. This list would be links to pages with the videos on them, like the Related Videos feature of YouTube works.

Requirement Amendments

Additional Requirements

Add #	Date	Reason	Description
Add.BR.1			
Add.BR.2			
Add.BR.3			

Changed Requirements

Change #	Date	Reason	Description
Chg.BR.1			
Chg.BR.2			
Chg.BR.3			

Cancelled Requirements

Cancel #	Date	Reason	Description
Can.BR.1			
Can.BR.2			
Can.BR.3			

Future Requirements

Future #	Reason	Description
Fut.BR.1		
Fut.BR.2		
Fut.BR.3		