

ACCESS CONTROL IN A SOCIAL NETWORKING ENVIRONMENT

A Project Report

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Master of Science in Computer Science

by

Mallika Perepa

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The Undersigned Project Committee Approves the Project Titled  
ACCESS CONTROL IN A SOCIAL NETWORKING ENVIRONMENT

by  
Mallika Perepa

APPROVED FOR THE DEPARTMENT OF  
COMPUTER SCIENCE

---

Dr. Chris Pollett, Department of Computer Science Date

---

Dr. Sami Khuri, Department of Computer Science Date

---

Dr. Teng Moh, Department of Computer Science Date

APPROVED FOR THE UNIVERSITY

---

Associate Dean Office of Graduate Studies and Research Date

## **ABSTRACT**

### **ACCESS CONTROL IN A SOCIAL NETWORKING ENVIRONMENT**

Collecting users into groups is a common activity in social networking sites such as Facebook, Google groups, Yahoo groups and many other web applications. This project explores access control techniques for dynamically created groups. The starting point was Yioop [1], a PHP-based search engine. The ability to create social groups was added to Yioop. The Grouping feature is enhanced by adding additional features like: blogs and pages for each individual user and as well as for groups of users. Access control is provided to every group and each user within a group based on the ownership of the group or blog. Adding these features along with the access control techniques allows users to use Yioop as a searchable social networking website. Techniques for automatically adding the access levels to groups and blogs have been explored. Activities like changing the group privacy options and transferring the administrative privileges to users within a group were implemented. Experiments were conducted to compare the access control methods of the existing social networking sites with the access control methods in Yioop and based on the comparisons it can be said that Yioop now includes the basic access control methods that a user likes to have.

## **ACKNOWLEDGEMENTS**

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## INTRODUCTION

Creating groups dynamically is a popular and useful feature in many web applications and social networking websites. An option to create a group is usually provided on the home page of the web applications or on the social networking websites. For example in Facebook, users can create a group by clicking on ‘Create Group’ under Groups section on the left side panel of the Facebook homepage. Dynamically creating groups is an interesting feature that makes it easy for a user to connect with different sets of people like, family, friends, coworkers, classmates, and also with people who share similar interests. Once a group is created, access control can be provided to the members of a group based on the user role within that particular group (group owner vs. user).

This project explored access control techniques for dynamically created groups in Yioop, a PHP based search engine. A Manage Groups feature is added to Yioop, which adds the ability to create social groups to Yioop. The Manage Groups feature includes several activities like, adding new groups, deleting existing groups, and viewing every member of a group, and transferring the admin rights of the owner of the group to a different user within the group. Another feature Blogs and Pages is also added to Yioop, which uses the grouping functionality. The Blogs and Pages feature includes several activities like, creating a blog, adding groups to a blog, adding a blog entry or post to a blog, transferring the admin rights of a blog owner to a different user, deleting an existing blog and a blog entry. Also, a feature to create an anonymous account is added to Yioop. This feature allows users to use Yioop, both as a traditional search engine as well as a searchable social networking site by logging into their own account.

In Chapter 1, the Yioop search engine is introduced and the preliminary work that has been done to add Manage Groups feature to Yioop is discussed. This chapter also includes the experiments conducted on existing social networking websites and shows the comparisons of the Grouping activities to help better understand how access control is provided for dynamically created groups so that, a simple and a user friendly “Manage Groups” feature can be implemented in Yioop. In Chapter 2 the design and the implementation of the Manage Groups feature and all the different activities that are included in the Manage Groups feature is discussed in detail with examples. In Chapter 3, the design and implementation of Blogs and Pages feature is discussed in detail. Chapter 4 includes the detailed experiments that are conducted to compare the access control methods of existing social networking sites with the access control methods in Yioop. This chapter also includes detailed explanation of anonymous account creation feature in Yioop. Finally, in Chapter 5 a brief conclusion of the project. A list of references has been included at the end.

## CHAPTER 1

### YIOOP SEARCH ENGINE

The Yioop search engine can be used both as a regular search engine as well as a search engine that performs searches on a pre-defined set of URL's given by the users i.e., users can customize the search results by performing a crawl and setting the URL's that the user wants as the index to be searched in Yioop. Yioop is written using its own model-view-controller framework with a user interface that is simple and user-friendly. The Seek Quarry [2] web site contains all the documentation and resources that are related to Yioop.

Prior to this project, Yioop did not have the ability to create social groups, blogs and pages. I have added a Groups feature and a Blogs and Pages feature in Yioop and provided access control to these features. Implementing these features in Yioop search engine unlike other popular social networking web sites is interesting as search of blogs and pages is baked in at a low level. Users can share blogs and pages with different groups as well as different users within a group who are associated with the blog or a page. Creating pages allows users and groups to have their own page for the articles they have written, like a wiki.

## PRELIMINARY WORK

As mentioned earlier, Grouping friends allows users to choose who can see what information and users can also choose the access controls for these groups. To understand the project better and to get an insight of how to design and implement the Manage Groups feature in Yioop, detailed experiments have been conducted on various existing social networking websites grouping feature. I have also explored access control to different groups and also different users within a group. I have also compared the accessibility of using groups between different web applications and social networking sites. The Group’s feature as implemented by Skype, Facebook, Google, and Yahoo are compared. The experiments are summarized in Table 1

Table 1: Comparison of accessibility of the Groups feature in different web applications.

Web Application	Option to create a group	Number of clicks to go to create a group option	Group privacy option	Transfer admin property	Group email address	Display a picture for group	Group chat	No. Of clicks to delete a group	User Friendly	Different modes in a group
Skype	No	2	NO	NO	NO	NO	YES	1	Simple, nothing much to do	NO
Facebook	Yes	1	Yes	YES	YES	YES	YES	1	Easy to use, more popular, it also includes all the features	YES
Google Groups	Yes	1	Yes	NO	YES	YES	NO	1-2	More number of submissions to create a group (less popular)	YES
Yahoo Groups	Yes	1	Yes	NO	YES	YES	NO	1-2	More number of submissions to create a group (less popular)	YES

I created groups in each of these web applications and tested the accessibility of creating groups. To analyze how easy or hard it is to create a group; I took several activities into consideration. I checked the availability of a ‘Create Group’ option on the home page of the web application, the number of clicks required to create a group and the

number of clicks required to delete a group. I also analyzed the group privacy settings and I analyzed how hard is it to change group privacy settings once a group is created. I experimented with the group chat facility and the transfer of the admin property within a group. I then compared the accessibility of these activities together. Figure 2 shows a window used to create a group in Facebook and another window that allows users to change the Group settings.



Figure 1: Window used to create a group and change the Group settings in Facebook

Source: Facebook web site: <https://www.facebook.com/help/412300192139228/>

Out of all the web applications, the Group feature on Facebook site is the easier to use feature to a user because the interface includes almost all the activities that a user likes to have and it also shows a detailed categorization scheme in which all the recent updates are displayed on the top of the page followed by less important updates. After conducting the experiments, I felt that implementing activities like changing the group privacy options and transferring the admin property to a different user within a group is interesting and challenging to accomplish. These activities play a very important role when a feature like Manage Groups and Blogs and Pages is implemented.

## CHAPTER 2

### MANAGE GROUPS IN YIOOP

We now describe how ‘Manage Groups’ feature was developed and implemented in Yioop search engine. The design of Yioop is in model-view-controller architecture. In Manage Groups, the user makes a request to add, delete, or view groups, the request goes to the controller and the controller dispatches the request to a corresponding action and sends to model. Model performs the required action and sends the database response to the controller. Then, the controller renders the view and sends the response to the browser.

The database tables for Manage Groups feature is designed in such a way that it stores the data effectively and retrieves the stored data efficiently. For the Manage Groups feature, I added three tables to the existing Yioop database. The tables that have been added are: GROUPS, USER\_GROUP, and GROUP\_ROLE. Figure 2 displays the columns that are present in each of the three tables.

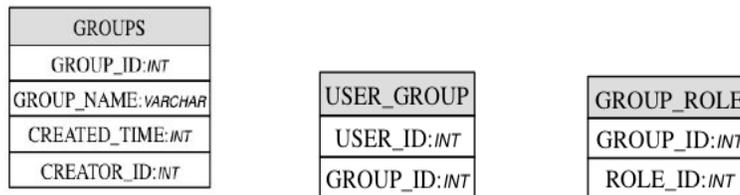


Figure 2: Schema for the tables: GROUPS, USER\_GROUP, and GROUP\_ROLE

The Manage Groups feature adds the ability to create social groups to Yioop. The Manage Groups feature includes several activities like: Add Group, Delete Group, and View Groups. Figure 3 shows the class diagram for the Manage Groups feature.

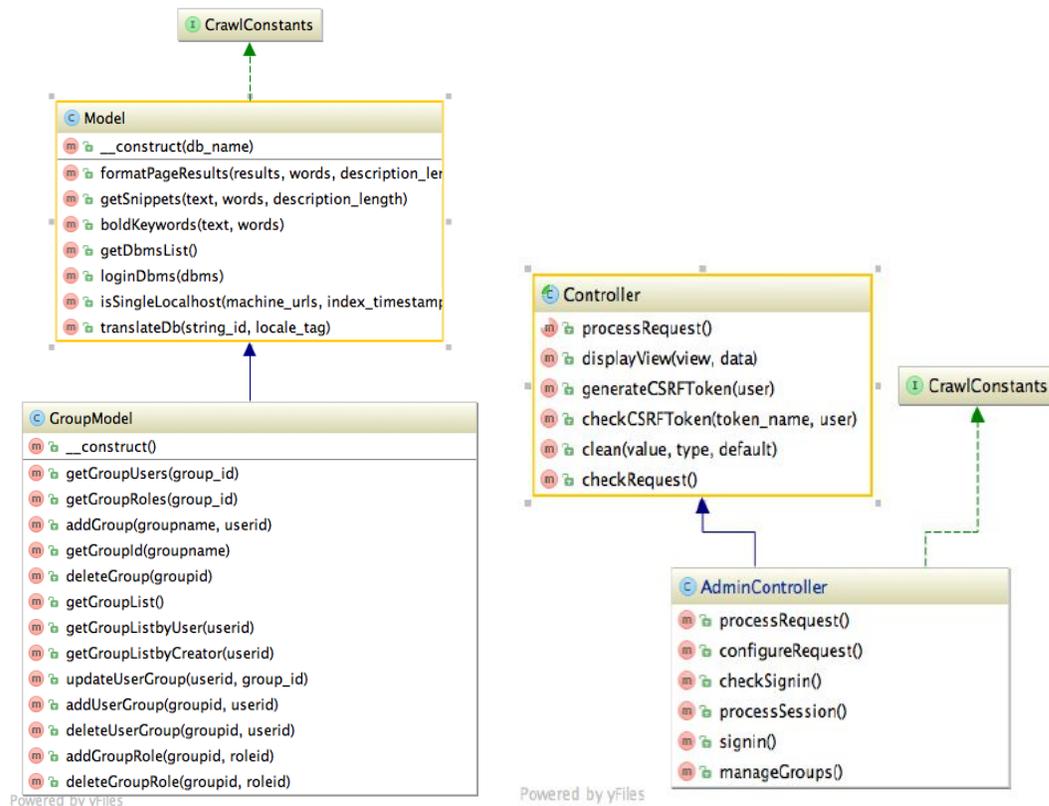


Figure 3: Class diagram for Manage Groups feature

The Manage Groups feature has a method `manageGroups ()` in the admin controller class that processes the user requests. The admin controller class extends Controller class and implements CrawlConstants interface. Then, the request from the admin controller is sent to the GroupModel, which performs the activities like creating a group, deleting a group, adding users and roles to a group etc. and sends the response to the admin controller. Then the controller renders the view.

## MANAGE GROUP ACTIVITIES IN DETAIL

After implementing the add, delete, and view group activities, the Manage Groups feature in Yioop appears as follows.

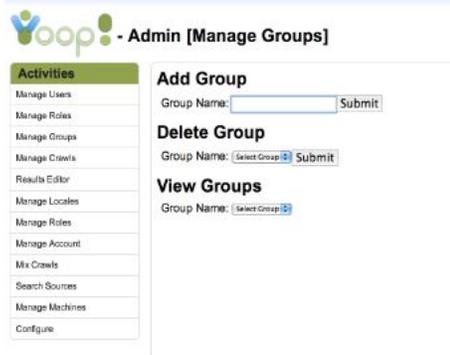


Figure 3: Manage Groups feature in Yioop

### Add Group activity

The Add Group option allows users to create a new group by providing a Group name. A User creates a group by typing the group name under the Add Group field and clicking the submit button beside the text box.

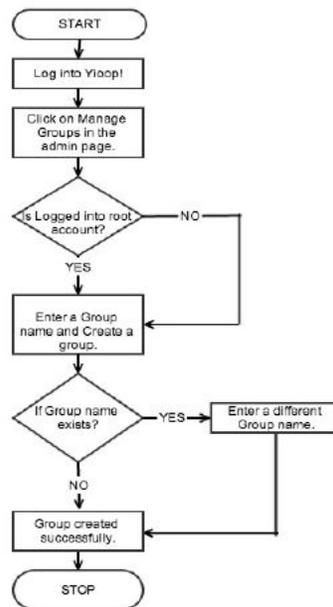


Figure 4: A flow diagram for the Add Group activity

If the group name that the user entered already exists, it will display a message saying that the group name already exists. A user needs to enter a unique group name to create a group. Upon successful creation of a group, a Group Name Added message

appears on the top of the page and the group name is stored in the GROUPS table with the GROUP\_ID, GROUP\_NAME, CREATED\_TIME, and the CREATOR\_ID and the information of the user who created the group will be stored in the USER\_GROUP table with the USER\_ID and GROUP\_ID.

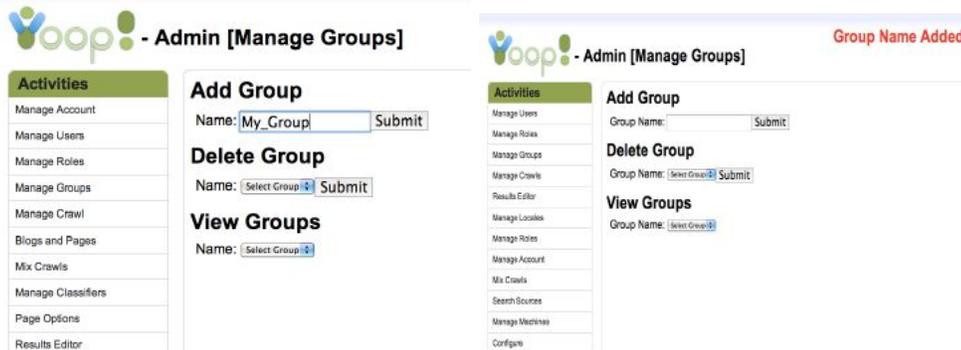


Figure 5: Creating a Group and a message upon successful creation of the Group

### Delete Group activity

Once a user creates a group, the group is displayed in a list of existing groups in the Delete Group option. Figure 6 represents a flow diagram for the Delete Group activity.

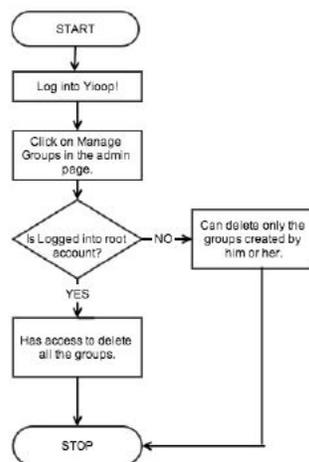


Figure 6: A flow diagram for Delete Group activity

A user can select the name of the group that he or she wants to delete and then delete the group. Upon successful deletion of a group, a Group Name deleted message appears on the top of the page and the group name are deleted from the GROUPS and the USER\_GROUP table. The deleted group name does not appear anymore. The following Figure 7 shows the delete group activity in Yioop.

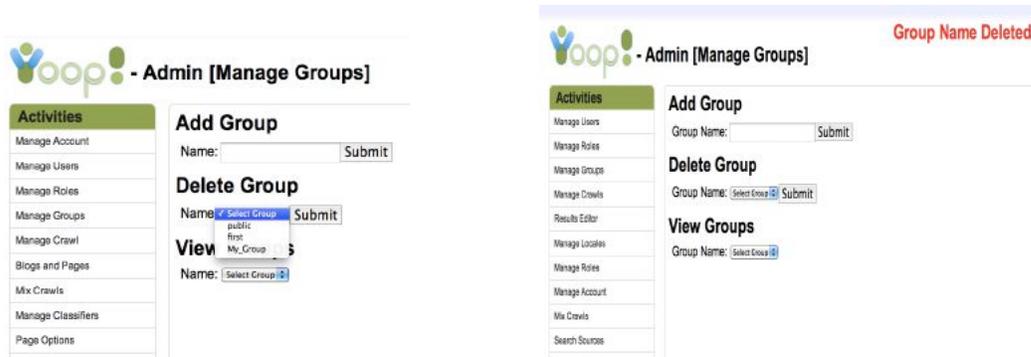


Figure 7. Deleting a Group and a message upon successful creation of the Group

### View Groups activity

The View Groups feature option allows users to view every member of a group. A person who creates a group is designated as the group owner. The owner of the group can add and/or delete users from an existing group. The View Groups feature also allows admins to manage groups with permissions. When a user is logged into Yioop, the View Groups option allows users to view the groups that the user belongs to. They can add and/or delete users and roles to and from a group. Once the user selects a particular group from the list of the existing groups he or she belongs to, all the users who are already in the group are displayed. In this example, the selected Group is 'My\_Group' and under Add User activity we can see the owner of the Group, in this case the owner of the Group 'My\_Group' is root because the user is logged into the root account, with a link to transfer the admin rights to different users within the group.



Figure 8: View Groups feature when a user selects an existing group.

The View Groups feature includes activities like: Add User and Add Role.

New users can be added to a group by using Add User activity. If the user has been added to the group successfully, the information is stored in the database table `USER_GROUPS` with the `USER_ID` and the `GROUP_ID`. Similarly, new roles can be added to a group by using Add Role activity. By assigning a role to a group, the group will be able to access all the activities that are assigned to that particular role. Upon successfully adding a role to group, a row is created in the `GROUP_ROLE` table with the `GROUP_ID` and the `ROLE_ID`.

When the Admin user is logged into Yioop, all the group names are displayed under the View Groups option. An Admin user has access to manage all the groups. Such a user can create a new group and delete any of the existing groups including the group that is created by a regular user. He or she can also add and delete a role to and from all the groups. The user who creates a group is the admin for the group. He or she can add or delete users to and from a group. The following Figure 9 shows the flow of View Groups feature.

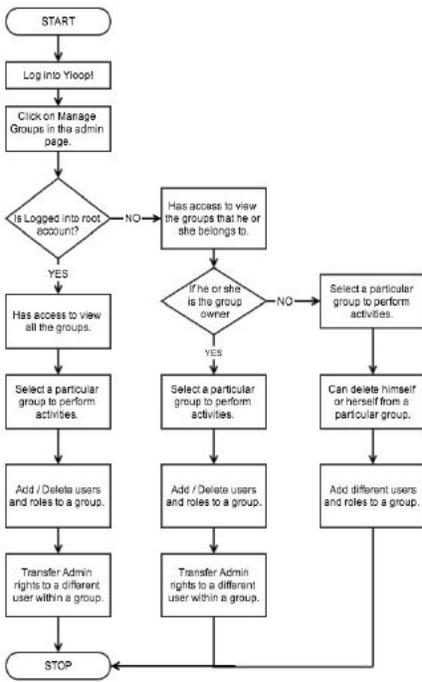


Figure 9: The flow diagram of View Groups feature in Yioop.

When a regular user is logged into Yioop, he can view only the groups that they created and/or joined. He can delete only those groups, which are created by him. He can also remove himself from a group to which he was added.

Let us consider that a user is logged into the root account, which is the admin account in Yioop, who creates a new group named “My\_Group”. Because he is the group owner, a transfer admin link is displayed next to “My\_Group” under view groups field. Being the group owner he can add and delete other users from the group. Upon successful addition of a user to My\_Group, the Admin can view a delete option. This delete option allows the group owner to delete the user if he does not want a user to be in that particular Group.



Figure 10: View Groups after adding the user 'John' to 'My\_Group' group.

When the user 'John' who is the regular user, is logged into Yioop, he can view 'My\_Group' group under View Groups field because he belongs to the 'My\_Group' group. He has permission to delete himself from the group but not the root user as the root user is the admin for the group. Figure 8 shows a window where a regular user John is logged into Yioop.

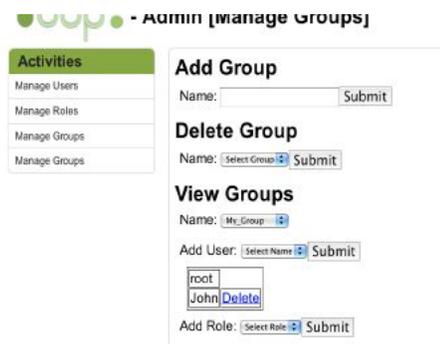


Figure 11: View Groups feature when a regular user John is logged into Yioop

The user who creates a Group can transfer the admin rights to a different user within the group. Figure 12 shows the transfer of admin rights activity of the Group 'My\_Group' to another user. After selecting the user to whom the group owner wants to transfer the admin rights of My\_Group, a confirmation box appears asking if the admin of the Group wants to transfer the admin rights of the Group to a different user. If the admin of the Group clicks Ok then the selected user becomes the admin of the Group.

Now the user root becomes the member of 'My\_Group' without admin privileges and John becomes the admin of 'My\_Group'.

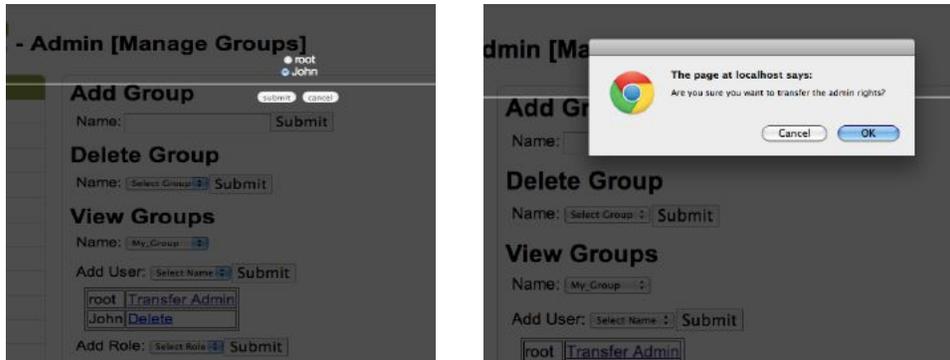


Figure 12: Transfer Admin activity in Yioop.



Figure 13: Upon successful transfer, root becomes the member of 'My\_Group'

Upon successful transfer of admin rights to user John, John is the owner of 'My\_Group'. So, he will have the option to add or delete users to 'My\_Group.' Figure 14 Shows that John is the admin of 'My\_Group.' He can also transfer the admin rights to another user if he wants to.



Figure 14: View Groups showing John as the admin of 'My\_Group'

Based on the respective actions that are performed in the 'Manage Groups' feature in Yioop by the user, changes are made in the database tables and accordingly the information is displayed.

## CHAPTER 3

### BLOGS AND PAGES IN YIOOP

Writing blogs is an interesting social activity where the authors can express their thoughts and ideas on a narrow subject or on a wide range of subjects. A blog mainly consists of an idea or an article on a topic that the author posts and bloggers can express their thoughts or view points on the blog. These posts can be written in the text area allocated to comment about the blogs.

As with the Manage Groups feature, the design of the Blogs and Pages feature in Yioop is simple and easy to understand. This feature helps users to write about the topic they want to share their thoughts on. They can also create pages on a specific chosen subject or on a wide range of subjects. I have added two new tables, ACCESS and BLOG\_DESCRIPTION to Yioop database and used existing database tables MEDIA\_SOURCE and FEED\_ITEMS. Figure 15 shows the columns that are present in these four tables.

ACCESS	BLOG_DESCRIPTION
NAME: VARCHAR	TIMESTAMP: INT
ID: INT	DESCRIPTION: VARCHAR
TYPE: VARCHAR	

MEDIA_SOURCE	FEED_ITEM
TIMESTAMP: INT	GUID: VARCHAR
NAME: VARCHAR	TITLE: VARCHAR
TYPE: VARCHAR	LINK: VARCHAR
SOURCE_URL: VARCHAR	DESCRIPTION: VARCHAR
THUMB_URL: VARCHAR	PUBDATE: INT
LANGUAGE: VARCHAR	SOURCE_NAME: VARCHAR

Figure 15: Tables used to implement Blogs and Pages feature.

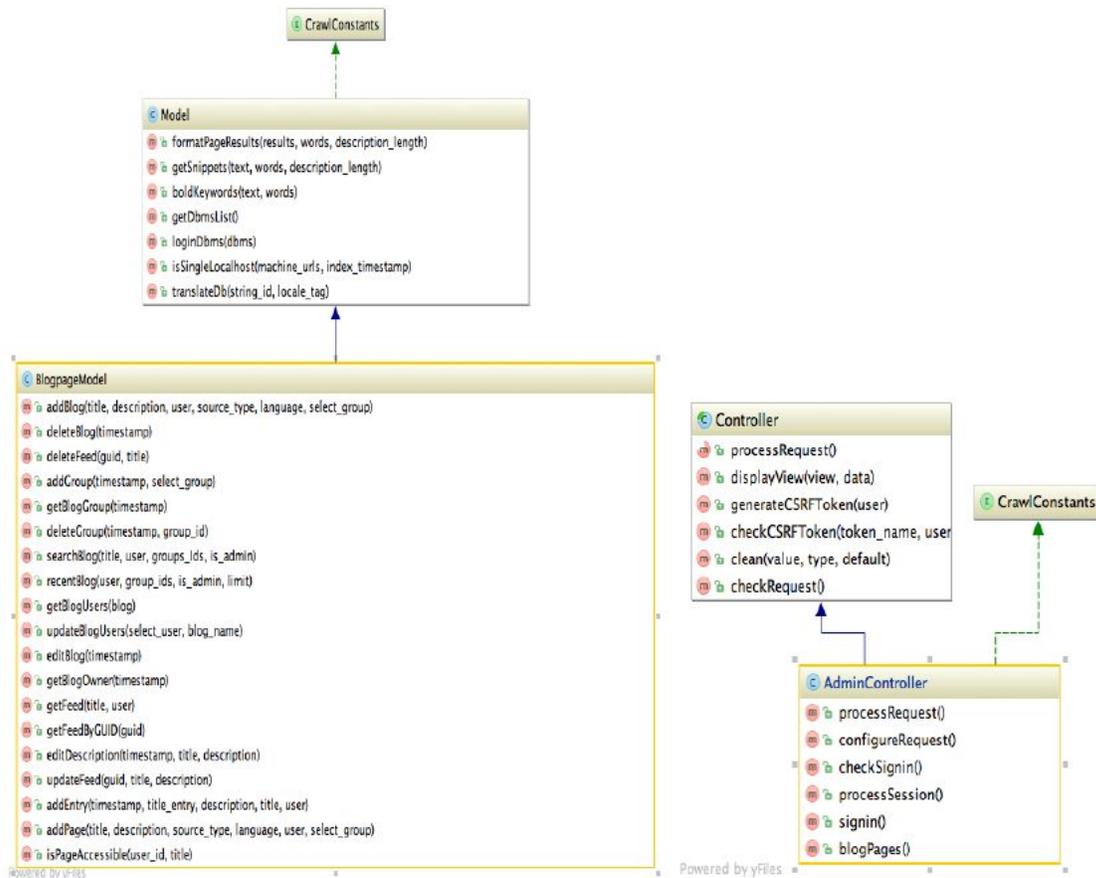


Figure 16: Class diagram for Blogs and Pages feature

The Blogs and Pages feature has a method `blogPages ()` in the admin controller class that processes the user requests. The admin controller class extends Controller class and implements CrawlConstants interface. Then, the request from the admin controller is sent to the Blogpage Model, which performs the activities like creating, deleting, editing a blog, adding groups to a blog or a page etc. and sends the response to the admin controller. Then the controller renders the view.

After implementing the Blogs and Pages feature in Yioop, the web interface of Blogs and Pages feature is as shown in the Figure 17.



Figure 17: Blogs and Pages feature in Yioop

Blogs and Pages feature includes several activities:

- Creating and finding a blog or a page
- Searching a blog or a page
- Editing and deleting a blog or a page
- Adding and deleting groups to or from a specific blog
- Transfer admin rights of a blog to a different user
- Adding, editing, and deleting blog entries to a particular blog.

Each of the above activities will be explained in detailed with examples and screen shots.

## **BLOGS AND PAGES ACTIVITIES IN DETAIL**

### **Create a blog activity**

Creating a blog allows users to discuss their viewpoint on a subject or different sets of subjects based on interests. These blogs can also be associated to different groups. Once a blog or a page is assigned to a group, all the users who are in the group can access the blog. Figure 18 displays a flow diagram for creating a blog by a user.

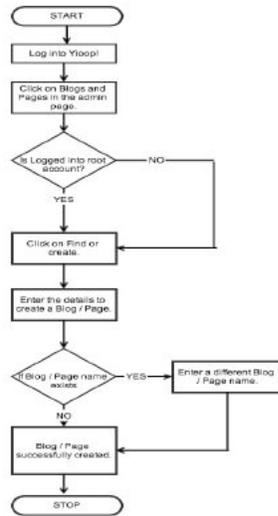


Figure 18: Flow diagram for creating a blog.

To create a blog, the logged in user clicks on the Blogs and Pages on the left side activity panel in Yioop. Then, click on the Create or Find button that is present beside the search bar. After clicking on the create button user will be taken to an interface where he can create a blog. Figure 19 shows the user interface to create a blog.

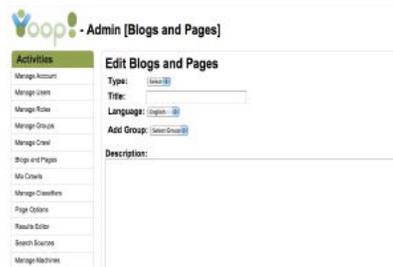


Figure 19. User interface to create a blog or a page.

A user can create a blog by selecting the type to be blog, specifying the title of the blog and the language of the blog from the list of languages. If the user wants to add a group to a blog then he can select a particular group that he wants to add to the blog and finally he can write an article about the chosen subject in the description field and click

on the save button. Upon successfully creating a blog, a row is created in the MEDIA\_SOURCE table, ACCESS table, and the BLOG\_DESCRIPTION table.

### Find a Blog activity

A user can look up for a blog with a specific title. If there are any existing blogs with the search title then the result will be displayed under ‘Related searches.’ When a search is performed, the search results are retrieved from the database tables and displayed on the web interface. For example, if the user is looking for a blog with title ‘My\_Blog’ he will type ‘My\_Blog’ in the search bar and click on Find button as shown in the following Figure 20.



Figure 20. Look up for a blog titled ‘My\_Blog’

As there is a related blog with title ‘My\_Blog’ it will be displayed as the search result for the titled query. Figure 21 displays the search results for the blog ‘My\_Blog.’



Figure 21. ‘My\_Blog’ appeared under Related Blogs.

If the entered blog title is not found then the user is taken back to the interface where he or she can create a blog. The table under ‘Recent Blogs’ field displays the top 5

recently updated blogs. If the user is looking for a blog, which is not displayed in the recent blogs table, he or she can search for a particular blog with its title.

## Editing a blog

A user can view a particular blog in detail by clicking on the title of the blog. After clicking on the title of the blog he will be taken to the user interface where he can view the details of the blog like the title of the blog, language of the blog, and the complete blog description. This interface includes a ‘Settings’, a ‘Transfer Admin’, and ‘Add Blog Entry’ link. If the logged in user is the owner of the blog, he or she can edit the blog by clicking on the ‘Settings’ tab. If the logged in user is not the owner of the blog then he or she will not be able to change the blog settings, they can only add blog entries by clicking on the ‘Add Blog Entry’ link. Figure 22 shows the user interface that displays ‘My\_blog’ in detail with the links mentioned and the interface when the user clicks on the ‘Settings’ link. By clicking on the link, he will be able to edit the details of the blog.



Figure 22: User interface that shows ‘My\_Blog’ in detail

Now, the user can edit the details of the blog on the editable interface. To successfully update the edited blog details the user needs to click on the save button which is present at the bottom of the page. Providing access to edit the blog makes it

easier for the blog owner to add or delete groups and blog entries to and from the blog. The blog owner can add or delete multiple groups to a blog. Adding a group to a blog means the blog owner is sharing the blog with different groups. All the members of the groups that are added to a blog will be able to view the blog and write the blog entries. The details about the blog entries are mentioned in the coming sections of this Chapter.

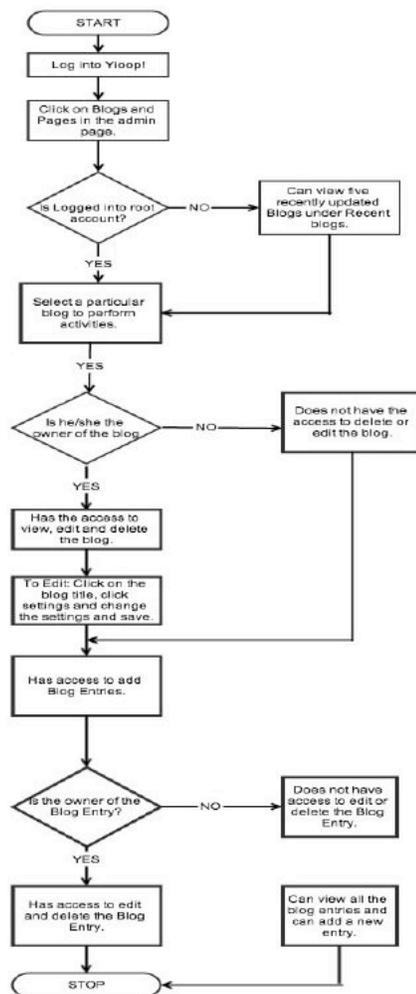


Figure 23: The flow diagram illustrating the edit blog activity.

A blog owner will be able to transfer the administrative rights of the blog to different users who are associated with the blog. Once the blog owner transfers the admin

rights to a different user, he or she will no longer have the access to the administrative privileges. Now, they are simply the members of the blog. But the new user to whom the rights are transferred becomes the blog owner and gets to access the admin privileges. Depending on the type of activity performed, changes are made in the database tables and information is retrieved accordingly.

### Delete a Blog activity

Delete activity can be used when user wants to delete a blog. User can delete a blog only if he or she is the blog Admin. In other words, if the user is not the owner of the blog then he or she will not have the access to delete the blog but they can write blog entries for the blog. Delete activity will help the blog Admin to delete a blog if he or she does not want to use or share to the blog. When a blog is deleted, all the rows of data associated to the blog will be deleted from the database tables ACCESS, MEDIA\_SOURCE, FEED\_ITEMS, BLOG\_DESCRIPTION permanently. Figure 24 shows the delete blog activity.



Figure 24: Deleting a blog named 'My\_blog.'

If a regular user who is not the blog owner but is a member of the group that is added to blog, is logged into his or her account he or she will not have access to delete the blog. The Delete link does not appear.

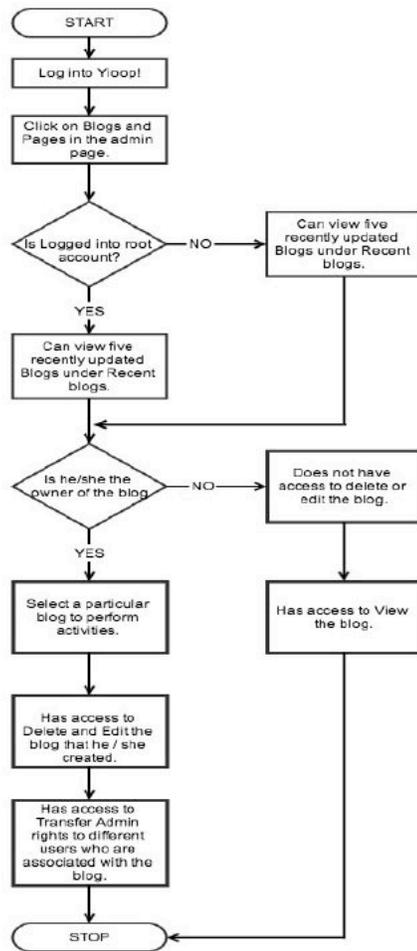


Figure 25: Flow diagram for deleting a blog

### Add a Blog Entry activity

Blog entries are nothing but comments or posts that are written by a user for a particular blog. Even though the user is not the owner of the blog he or she can still add an entry to the blog if they are the members of a group that has already been added to the blog by the blog owner. This feature helps users to share their thoughts and ideas on the blog article. ‘Adding Blog Entry’ activity in Yioopl has enhanced the usability of the Blogs and Pages functionality. After adding a blog entry access control is given based on the ownership of the post. The owner of the blog entry can edit or delete that particular

entry, which he or she has written. If the user is not the owner of the blog entry he or she cannot edit or delete the blog entry. They can comment on the article by writing another entry.

Once the user clicks on the Add Blog entry link he will be displayed with a user interface where he will be able to enter the title of the post as well as the description of the post. Figure 26 shows a web page where user can write a post for the blog ‘My\_Blog.’



Figure 26: User interface where the logged in user can write a post for ‘My\_Blog’

The user can enter the title and the description of the post and click on ‘Save’ button. Upon successful creation of the blog entry, a success message is displayed on the screen. All the blog entries that are written for ‘My\_Blog’ are displayed in a table named ‘Blog Entries.’ This table will include all the posts written by different users who are related to ‘My\_Blog.’

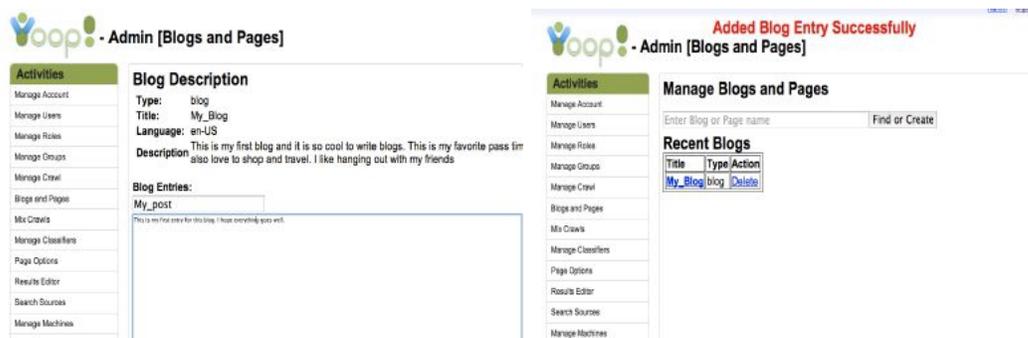


Figure 27: Interface displaying adding a new blog entry.



Figure 28: The blog entry ‘My\_Post’ appears in a table with Edit and Delete options

Let us consider an example where the logged in user is the blog entry owner so he or she can edit and/or delete the blog entry or the post. Owners of a blog entry can edit and update the blog entry by clicking on the edit link. Figure 29 shows the activity window where the owner of the post can edit and update the post.

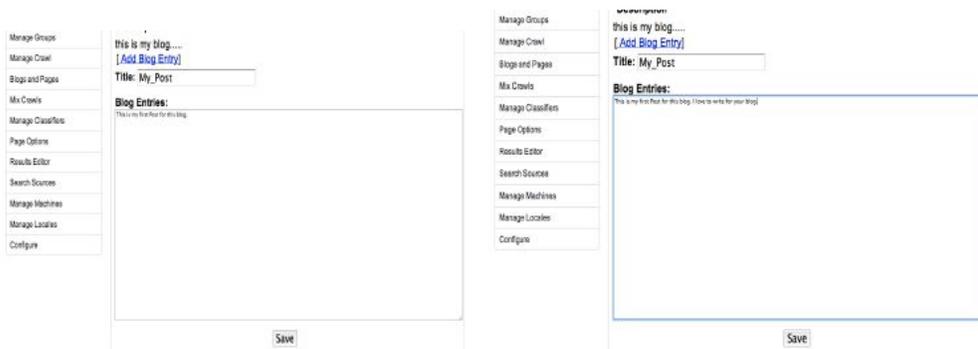


Figure 29: Web interface where the owner of the blog can edit the blog entry



Figure 30: The updated post with the new line of description is shown in the blog entries table

If the owner of the blog entry wants to delete the post, he/she can click on the Delete link and completely delete the post. If the logged in user is not the owner of the blog entry then he or she cannot edit or delete the blog entry. The following Figure 31 shows no Edit and Delete links because the logged in user is not the owner of the blog entry ‘My\_Post.’



Figure 31: Blog Entries table without edit and delete links

## CHAPTER 4

### COMPARISION OF ACCESS CONTROL METHODS

After designing and implementing the features like ‘Manage groups’, ‘Blogs and Pages’, and ‘Anonymous account creation’ in Yioop along with the access control techniques, I have compared the access control methods used in different features in Yioop to that of the access control methods in the existing social networking websites to get an insight of the accessibility of using these different features in Yioop.

Firstly, the Groups feature as implemented by Skype, Facebook, Google, and Yahoo is compared with the Groups feature as implemented by Yioop. Table 2 summarizes the experiments conducted.

Table 2: Comparison of the Group’s feature in different applications

<b>GROUPS FEATURE</b>	<b>Create Group</b>	<b>Delete Group</b>	<b>Add Users to a Group</b>	<b>Transfer Admin Rights</b>	<b>Add Blogs to a Group</b>	<b>Modes of a Group</b>	<b>Group Privacy Options</b>
<b>YIOOP</b>	YES	YES	YES	YES	YES	YES	YES
<b>FACEBOOK</b>	YES	YES	YES	YES	NO	YES	YES
<b>YAHOO</b>	YES	YES	YES	NO	NO	YES	YES
<b>SKYPE</b>	NO	NO	NO	NO	NO	NO	NO
<b>GOOGLE</b>	YES	YES	YES	NO	NO	YES	YES

As mentioned earlier, the table summarizes the comparison of the Groups feature in the web applications like Facebook, Google groups, Yahoo groups, Skype, and Yioop. I have created groups in each of these web applications and compared if the existing Groups’ feature includes the activities for the user like creating a group, editing a group’s

privacy options, deleting a group, adding different users to an existing group, transferring admin rights to another user within a group, adding groups to a blog, and also whether the user has an option to select different types of groups like: public and private that he or she wants to be a part of based on the users' interest. After comparing all these activities in the 'Manage Groups' feature on Yioop along with the existing Groups feature in different web applications, it can be summarized that the 'Manage Groups' feature on Yioop is a user-friendly and accessible feature to a user because the interface includes almost all the activities that a user likes to have while customizing a group according to his or her interests.

After, testing some of the basic activities of the Groups feature in different web applications, detailed experiments were conducted to compare different access control techniques used in the Groups feature between all these web applications. The experiments are summarized in the Table 3

Table 3: Comparison of the access control techniques Group's feature in different applications

<b>GROUPS PRIVACY OPTIONS ADMINISTRATOR</b>	<b>ADD USERS TO GROUP</b>	<b>DELETE USERS FROM GROUP</b>	<b>TRANSFER ADMIN RIGHTS TO OTHER USERS IN THE GROUP</b>	<b>TYPES OF USERS IN A GROUP</b>	<b>ADD ROLES TO USERS</b>
<b>YIOOP</b>	YES	YES	YES	ADMIN, USERS	YES
<b>FACEBOOK</b>	YES	YES	YES	ADMIN, MEMBERS	YES
<b>GOOGLE</b>	YES	YES	YES	OWNER, MANAGER, MEMBER	YES
<b>YAHOO</b>	YES	YES	NO	OWNER, MEMBER, MODERATORS	YES

The experiments that have been conducted above are mainly focused on the access control methods and the group privacy options. After a group is created, I have

conducted experiments to compare the access control techniques used in the Groups feature. For example, how easy or difficult is it to add or delete different users to and from an existing group and how easy is it to edit the privacy settings and transfer the admin rights to a different user within the group between the web applications like Yioop, Google groups, Yahoo groups, and Facebook.

Similar to the comparisons of the Groups’ feature and the access control methods used in the grouping feature between all the web applications, Table 4 illustrates the comparison of the Blogs and Pages feature in Yioop to that of the blogging feature in the existing Blogger website.

Table 4: Comparison of the Blogs feature between Yioop and Blogger website

<b>BLOGGING FEATURE</b>	<b>Create Blogs</b>	<b>Delete Blogs</b>	<b>Edit Blogs</b>	<b>Add Entries to a blog</b>	<b>Add comments to a blog entry</b>	<b>Edit/Delete Blog entry</b>	<b>Blog Privacy Options</b>	<b>Adding Groups to a Blog</b>
<b>YIOOP</b>	YES	YES	YES	YES	YES	YES	YES	YES
<b>BLOGGER</b>	YES	YES	YES	YES	YES	YES	YES	NO

After developing and implementing a feature to create blogs and pages in Yioop, I have created blogs in existing blogging websites like Blogger, Word Press etc., and tested the accessibility of the feature. Then, detailed experiments have been conducted to compare how access control techniques are being used in the blogging feature between these web applications. I have analyzed if the existing Blogs feature in the Blogger website includes the activities for the user to create, delete, and edit the blogs. I have also checked if the Blogs feature included activities like: adding entries to a blog, editing or deleting an existing blog entry, and adding groups to a blog. After looking at all these activities in the ‘Blogs and Pages’ feature on Yioop along with the existing Blogs feature

in different web applications, it can be summarized that the ‘Blogs and Pages’ feature on Yioop is a easy to use feature to a user because of its simple and clean interface. It includes all the activities that a user likes to have when he is using a blogging feature on a website. He or she can also choose who can see his or her blogs, and they can also add different groups to their blogs based on interests the users share.

## ANONYMOUS ACCOUNT CREATION IN YIOOP

In most social networking websites users will be able to create their own account. In order to improve the privacy options in Yioop, I have designed and implemented a feature to create an anonymous account. An option to enable and disable the anonymous account is made available in Yioop. If the option to create anonymous account is disabled, user can use Yioop as a traditional search engine. But, if the option is enabled, user can create his or her own account that is, he or she need not go through the administrative account and use Yioop as a searchable social networking site.

Earlier, Yioop did not have the ability to provide these access privileges. Implementing this feature in Yioop helped in improving the privacy options that are provided to the Yioop search engine users. Figure 32 shows an option to create an anonymous account.

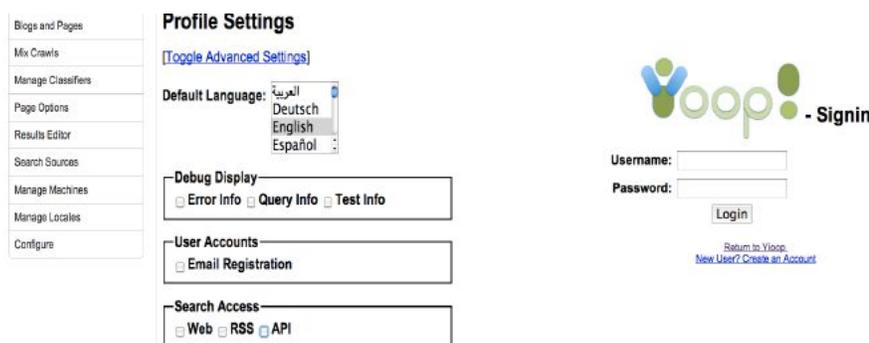


Figure 32: Activity windows displaying an option to create an account

After the user clicks on the link to create an account, he or she will have to provide details to successfully create an account. Figure 33 shows a user interface to create an account.



The image shows a web form for creating an account on Yioop. At the top left is the Yioop logo, which consists of a stylized 'y' made of three colored circles (blue, green, and yellow) above the word 'ioop' in a green, lowercase, sans-serif font. To the right of the logo is the text '- Create an Account'. Below the logo and title are six input fields, each with a label to its left: 'Firstname:', 'Lastname:', 'Username:', 'Email Address:', 'Password:', and 'Re-type Password:'. Each label is followed by a white rectangular input box with a thin border. Below the 'Re-type Password:' field is a button labeled 'Create Account'. At the bottom center of the form is a small, blue, underlined link that says 'Return to Yioop'.

Figure 33: Web interface to create an account

Upon successful creation of an account, users can login to Yioop using their own account.

## **CHAPTER 5**

### **CONCLUSION**

In this project I studied the basic functionality of Yioop and then designed and implemented the Manage Groups feature, Blogs and Pages feature and Anonymous account creation in Yioop. Adding these features in Yioop improves the capability of performing searches in the Yioop search engine by allowing users to search blogs and share them with members of different groups.

Experimenting with the ‘Groups’ feature, ‘Blogs’ feature, and the access control techniques used in these features on existing social networking sites such as Facebook, Skype, Google Groups, and Yahoo Groups helped me understand how access control is provided. Implementing access control techniques in Yioop improved the usability of each one of these features. The design and implementation of the user interface and the database schema is simple and efficient. Preventing unauthorized access to web server and database has been kept in mind while designing the features as well as the database tables.

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