



Trent University ayePoll On-line Voting System

System Manual

Version 1.0

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1 Introduction

Welcome to **ayePoll** On-line Voting System. **ayePoll** is a web based system that facilitates the running of elections and surveys online. This system has been developed by Softworks Dev to simplify the process of organizing elections and make it convenient for voters to vote remotely from their home computers while taking into consideration security, anonymity and providing auditioning capabilities.

This is the user's manual for the Administrator of the system. It will guide you through the architecture of the system, the roles of the users in the system, the steps to accomplish tasks, system health considerations and troubleshooting instructions in case you experience system malfunctions.

The manual is divided into twelve chapters, with the first six discussing the system architecture, considerations and how the administrator relates to the system overall. Chapters 7 and 8 provide guided instructions on how to accomplish administrative tasks, 9 through 12 provide troubleshooting information, considerations about the administrator's information, a system health checklist and a summary of the manual.

1.1 System Overview

Users are individuals who interact with the system. All user interaction is performed remotely through the user's web browser. Users of **ayePoll** are categorized into three classes: Administrator, Returning Officers and Voters. A running version of the system will have only one Administrator but it typically has multiple returning officers and voters. The administrator is responsible for managing user accounts, polls, system resources and logs and for the health and safekeeping of the system. Returning officers have the responsibility of managing a poll as assigned by the administrator, whereas voters only have the ability to submit ballots on polls in which they are admitted.

1.2 Purpose

This manual provides information on installing, maintaining and using **ayePoll** Online Voting System from the perspective of an administrator. It provides helpful topics and explanations regarding how to use the system and solve possible problems that may occur. Screenshots are provided in the manual for effective help.

This document is intended as a guide and reference to the administration of the ayePoll voting system. It can be used as either an educational document or a reference point in accomplishing administrative tasks. Read the manual before installing the system and keep it always at hand during system administration.

1.3 Intended Audience

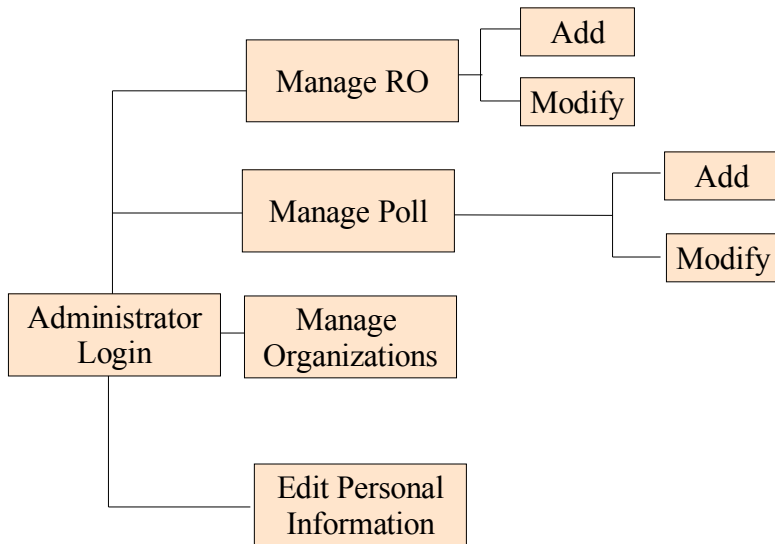
This document is geared towards the person(s) who will be responsible for installing, managing, and maintaining the system.

1.4 Definitions and Abbreviations

The following are terms used in this document to describe the system and its functions.

| | |
|-------------|---|
| Back up | Obtaining a copy of data from the system for use in future references. |
| GUI | Graphical User Interface. |
| RO | Returning Officer |
| Runoff Poll | A poll which the Returning Officer has declared the results to be indecisive. By declaring it as a runoff, a new poll can be instantiated by the Administrator so that new votes can be collected to collect clearer results. |
| Log | A record of events of interest with regards to system and polling activities. |
| Poll | An instance of an election containing a set of questions, a list of voters and settings managed by a Returning Officer. |
| SSL | Secure Socket Layer. A common protocol for conducting secure communications on line. |
| PHP | Hypertext Processor. A scripting programming language used extensively to develop web applications. |
| Apache | A popular and portable open source web server. |
| Debian | An open source community based stable GNU/Linux distribution used extensively as a web server. |
| PostgreSQL | An open source, SQL compliant ,object-relational database management system. |

1.5 Hierarchy of GUI Screens



1.6 Related Documents

In addition to this manual, Softworks Dev makes available the following documents for ayePoll users:

Poll Officer's User Manual

This document is intended as a guide for Returning Officers. It outlines their role in the system, and describes how to conduct a poll.

Voter's User Manual

This document is intended to be a guide for voters. It explains their role in the system, guides them through the voting process, and attempts to answer any questions they might have.

2 The Role of the Administrator

The administrator plays the role of system maintainer.

They are responsible for the following:

1. Managing System Administrative Access

- Assigning and managing returning officer accounts.
- Transferring the administrator role to another account.
- Creating polls and assigning the returning officers who will manage them.

2. Maintaining System Integrity

- Backing up each completed poll's data and safely storing it for future reference.

3. Ensuring System Availability

Maintaining enough free disk space to conduct polls.

The role of administrator is a position of trust, as they have direct access to the poll data. They may be an individual outside the organization which is conducting the poll. Ideally they also manage the server hosting the ayePoll system. They are the point of contact for the organization conducting the poll. The organization requests a poll, and supplies the information of the returning officer who will manage the poll. The administrator then creates the poll, assigns the organization's returning officer to manage it and arranges access for the returning officer.

3 Related User Roles

The administrator is the returning officer's point of contact to the system. The administrator manages the returning officer's account creating it, modifying it (lost password, disabling, etc...), or revoking it if requested by the organization. The returning officer is assigned to manage a poll by the administrator at the request of the organization conducting the poll. If the returning officer encounters any technical problems (can't access the server, disk space / database errors, etc...) during the course of a poll, they can contact the administrator to resolve the issue.

The administrator is the organization's contact person for creating a poll. The administrator can change the returning officer assigned to a particular poll at the organization's request. Also, a poll can be disabled at the request of the organization.

The administrator has no direct contact with voters. Their point of contact is the returning officer, or their organization. Voter issues can escalate through either the returning officer or the organization to the attention of the administrator (e.g. can't connect to server, etc..).

4 System Security

It is the responsibility of the administrator to ensure that the system operates securely. The administrator shall maintain a strong password (preferably one with more than 6 characters including numbers and not comprised of words from the dictionary) and ensure no one gets access to this; He shall regularly review event logs in the system to ensure that no suspicious activity has been taking place such as repeated failed attempts to login etc. It is also the responsibility of the administrator to ensure that no person gets direct access to the machine in which the system is running be it physical or remote access as data integrity cannot be guaranteed when people tamper with the system from the outside.

It is also the responsibility of the administrator to ensure that all packages and systems in which ayePoll depends are always current. In this regard, the administrator has the responsibility to ensure that bugs in PHP, PostgreSQL, Debian GNU/Linux, Apache are patched quickly as unpatched systems can open doors to intruders.

5 System Resources

ayePoll allows the administrator to set the maximum disk space available to the system as well as the maximum number of concurrent connections from clients web browsers that the system should support. Connections in excess of this limit will be gracefully queued by the system.

In regards to disk usage, apart from the quota entered by the administrator, the system will also detect the maximum physical space available in the disk and set its quota to be the smallest of the two so that if the amount of space left is actually less than that given by the administrator the system does not run into instability – this is the hard quota. This system also maintains internally a soft quota calculated as 80% of the hard quota. When this quota is exceeded, the system sends automatic notifications to the administrator requesting that he makes backups of poll and logs data in system so this can be discarded. Backed up data is then discarded. When the hard quota is exceeded while a poll is active, older data in the system is automatically packaged and e-mailed in chunks to the administrator. The philosophy applied is that newer data is more important than historical one: the designers of the system prefer to ensure that currently open polls run and terminate correctly rather than interrupting these in favour of polls that have long been closed.

6 Administrator Browser Requirements

The effective use of this system requires that the administrator have fairly recent web browsing facilities. This is an acceptable requirement as administrators of this system are expected to be computer literate to be able to install new web browser if required.

ayePoll requires that the administrator have a graphical web browser that complies with the HTML 4.0 specification, capable of handling JavaScript, Cascading Style Sheets(CSS) and the Extensible Markup Language (XML).

Internet Explorer 5 and above, Netscape 6 as well as Mozilla 1.5 and Firefox 0.8 and above can all handle these requirements.

Additionally, ayePoll provides step by step online animations that show how tasks are accomplished in this system, and to be able to view these the user will need a Macromedia Flash Player and appropriate plugin in their browser. This is not a requirement however.

7 Getting Started

7.1 Before Installing

ayePoll relies on services provided by other systems, including Apache web server, PostgreSQL database management system and the PHP scripting language interpreter. You will need to have these installed before you can install ayePoll. All of these external packages used are available for your use under open source licences and are free for use. Following is a description of all packages required and the location in which you will find manuals detailing their installation and configuration:

1. Apache-SSL – Apache is a powerful web server used by ayePoll to handle requests from clients for pages in the system. ayePoll uses Apache-SSL to ensure that communications with the client are encrypted and that clients are able to verify the server's authenticity. ayePoll supports Apache-SSL version 1.3.26.

You can download this system and accompanying manual from: <http://httpd.apache.org>

2. PostgreSQL – The Database Management System used to manage data stored in the system. ayePoll currently supports PostgreSQL version 7.2.1.

Packages and installation instructions can be found at: <http://www.postgresql.com>

3. PHP - PHP is the scripting language in which the server side components of ayePoll were developed. These components form the basis of the system and they perform all actions on behalf of the user. ayePoll supports PHP version 4.3.10.

PHP installation packages and manuals can be found at: <http://www.php.net>. Additionally you will need to install the module `php4-pgsql` which allows the system PHP to connect to the PostgreSQL database.

For each of the packages follow the installation/configuration instructions and ensure that they are running on your system, as discussed in their manuals.

7.2 The Installation

ayePoll is initially distributed in a Debian GNU/Linux installation package named `ayepoll-x.x.deb`, where `x.x` is the version number. In future, installation packages for other GNU/Linux distributions as well as other UNIX flavours will be made available.

The installation process is organized into two stages: installing the system packages in your machine and configuring the system.

The first stage consists of:

1. As the root user of your system go to the directory in which you have saved the installation package
2. In the shell command interpreter enter the command `dpkg -i ayepoll-x.x.deb`; remember to replace `x.x` with the actual version number.
3. The installation process will begin. Debian will check that you have a PostgreSQL database version 7 or above, PHP 4 or newer and Apache-SSL 1.3 or later installed. If any of these is not installed you will be requested to install it before the system installation can proceed.
4. All required files will be copied to the proper locations in your computer. By default, ayePoll will be installed in `/var/www/ayepoll`. In a default Apache-SSL configuration this directory would be accessible through the web. If the server root of your apache configuration is not `/var/www`, you may need to change this. To do so, see your Apache-SSL manual.

At this point, stage two will initiate. In this stage you will:

1. Be prompted to specify an administrator password.
2. Specify a password for a new database user `ayepoll` to be used by the system. The new database user will be created with the password provided, along with a database also called `ayepoll`. The installation process will then go on to create tables in the database and set up the system with the information provided.

When this stage terminates, if you are running Apache-SSL is running, you will be able to access ayePoll by directing your browser to: `https://localhost/ayepoll/admin.php`, assuming that the browser is on the local system where ayepoll was installed. Otherwise, in the URL above, replace `localhost` with the address of the server. Proceed with the instructions described in the section 7.3 Logging In below.

7.3 System Settings

Most system settings can be managed from within the system itself, after you login. A few, however need to be changed externally. Settings that affect the functioning of the system reside in the file `/www/var/ayepoll/settings.php` which is a regular PHP file containing settings variables. The following are the variables you may want to change:

1. `$SLOGAN` - the organization's slogan that is displayed in the header of all pages.
2. `$MAX_SESSION_MINUTES` - the number of minutes for which an inactive login session will last.
3. `$DATABASE_VOLUME` - the system volume or partition in which the database resides
4. `$DATABASE_DIR` - the directory in which the database is installed
5. `$db_name` - the name of the database, this should have been set correctly during installation.

Changing these variables simply means changing the value to the left of the equals sign (=), ensuring that quoted strings be replaced with quoted strings and that numeric values remain numeric. You should not change any of the other variables as doing so may lead the system to malfunction.

To change the colour schemes of the system, as well as font sizes, you need to make changes to the file `/www/var/ayepoll/ayepoll.css`. This is a cascading style sheet, so before attempting to make changes you must have prior knowledge of cascading style sheets.

7.4 Logging In

Gaining access to the Administrative Functions of the **ayePoll** system requires that you authenticate yourself as a valid Administrator. **ayePoll** employs the familiar username & password authentication scheme. To log in, do the following:

1. Load the login page located at `http://your-ayePoll-server-name/ayePolladmin.php`. You should be greeted with a login screen identical to the one in Figure 7.1 below.
2. Enter your username and password in the text entry fields provided. On your first login you will need to enter the username and password you supplied during the installation phase.

Upon successful completion of the login procedure you will be taken to the Administration Home Screen from which he will have access to the administrative features of the system.

If however, you have entered an invalid username or password during the login you will be prompted to re-enter this information.

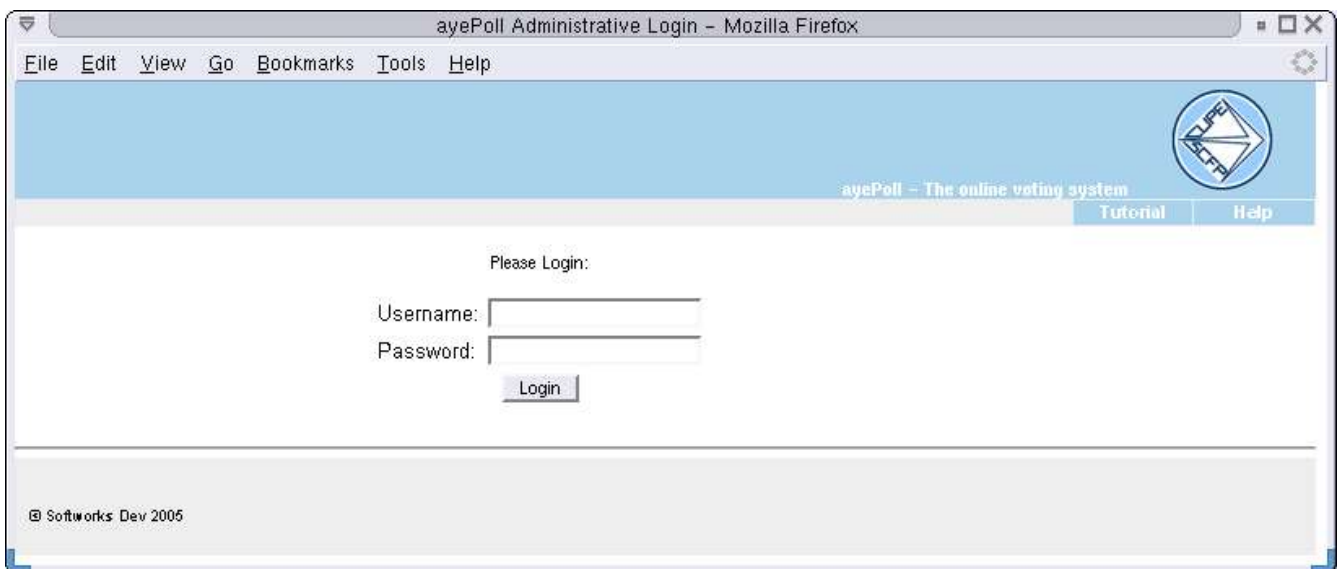


Figure 7.1: The login page

7.5 Logging Out

While logged in, you will see the “Logout” button at the top right of the administrative screens. In order to logout, you will need to click this button to prevent access to administrative features by unauthorized individuals.

Upon logging out of the system your current session will be terminated and to gain access to administrative features you will need to login again.

If you fail to logout however, your login session will expire after 40 minutes of inactivity. In this case, if you wish to access the system after the expiry of the session, you will be required to login again. This feature is in place to prevent wrongful access that may occur when an individual gains access to your computer.

7.6 Getting Help

ayePoll has built-in in all its administrative screens the following three features to assist you in managing the system:

Help A “Help” button appears at the top right corner of every page. It provides helpful instructions appropriate to the task at hand. (***) This feature of the system hasn't been implemented yet)

Tutorial The “Tutorial” button brings a short animation that briefly describes the procedures to complete the selected task. (***) This feature of the system hasn't been implemented yet)

Hints The hints section consists of an area in all administrative screens which display specific information about a particular page element as the mouse is hovered over the element.

8 Administrator Tasks

As the administrator of the system, you are responsible for ensuring that the system is running in a healthy state at all times. You are, thus the only user with access to system administration tasks.

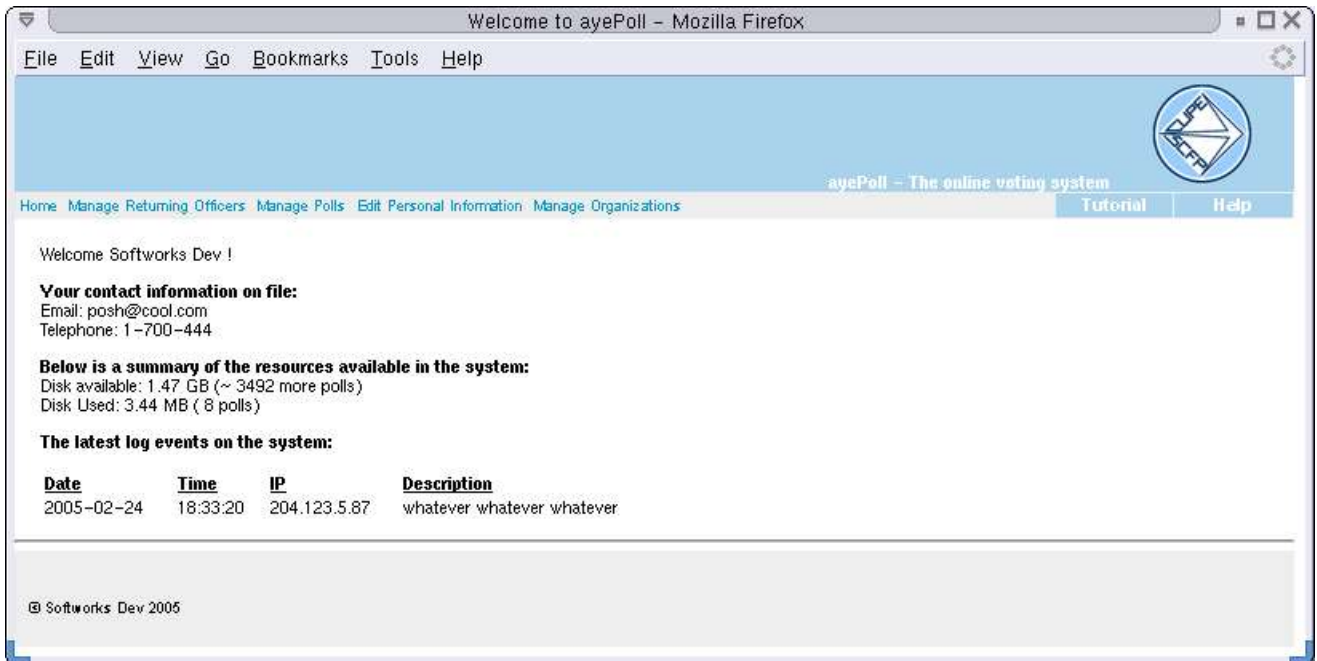


Figure 8.1 The Administrator Home Screen provides access to administrative tasks

8.1 Managing Accounts

Among the responsibilities of an administrator is the management of user accounts in the system. You can add new users and modify existing user accounts. You cannot, however, delete accounts as this system has been designed to provide the highest level of traceability of actions and as such accounts of individuals responsible for these must always be available for liability. The administrator can instead disable an account if for one reason or another it is necessary to prevent a user from accessing the system.

8.1.1 Adding and Modifying Accounts

In order to add an account, you must follow these steps:

1. From Administrator Home Screen shown in Figure 8.1 above click on the button labeled Manage Returning Officers. This will take you to the Manage Returning Officers screen where you will see all the returning officers in the system. (Figure 8.2).
2. In order to add an account for a returning officer click on “Add” button, which will take you to the screen where you have to enter returning officer's information such as his username, password, e-mail and other contact information.
3. Click on the button labeled “Save” and this will save this user's account information to the system and take you back to the Manage Returning Officers screen. If you don't want to save the information you entered click on “Cancel” button which will take you back to Manage Returning Officers screen.

Note, however that in creating a new account you must enter a username not already in use by other users.

If you intend simply modify an existing account, such as by changing the account holder's name, contact information or even disabling the account, you will follow the steps 1 through 3 above, however, prior to step 1 you must select an account from the list, in step 1 you must click on “Modify” , and in step 2 you simply modify the property you want.

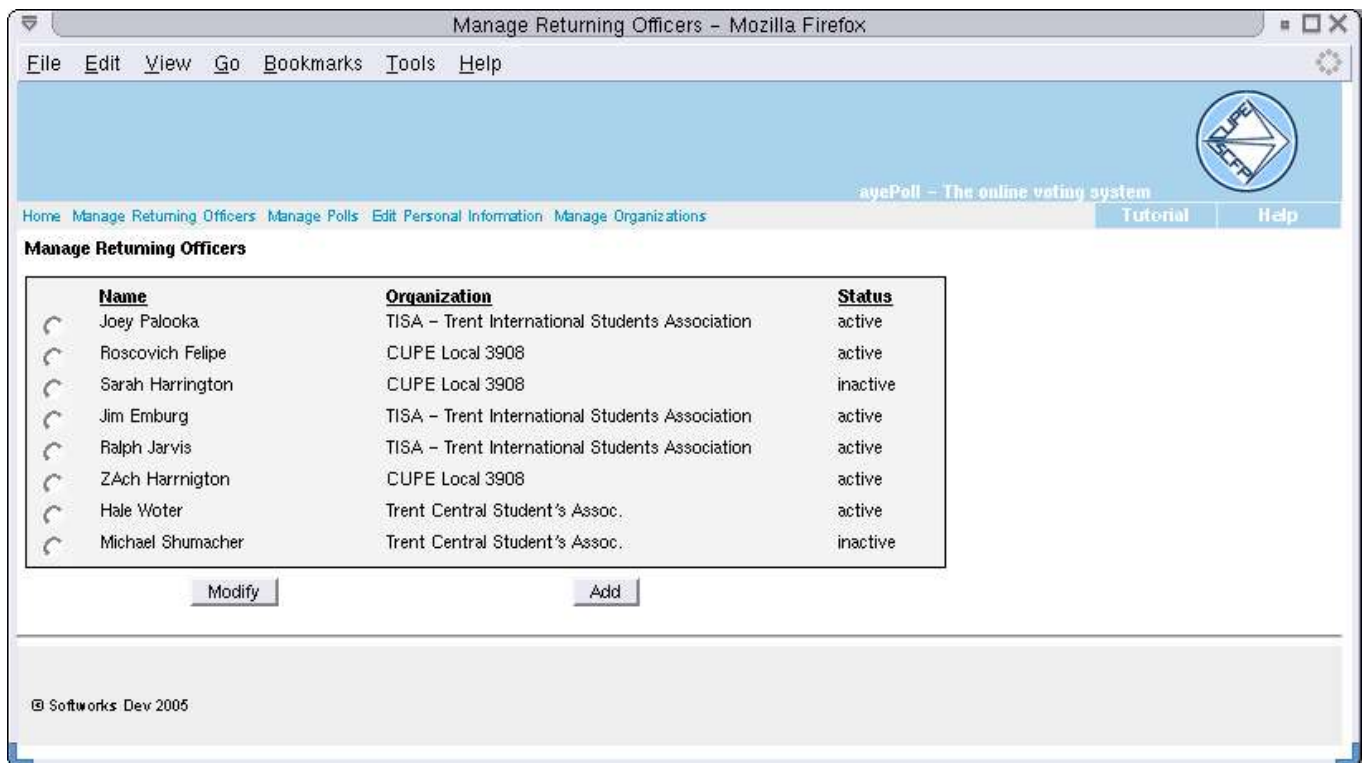


Figure 8.2 Manage Returning Officers screen.

8.2 Managing Polls

During its lifetime a poll goes through several states. These states define not only how far in its lifetime a poll is but also what actions can take place. The following are the possible status of a poll:

Pending – a poll is pending when it has been created by the administrator however its opening date has not been met.

Running – a poll is running when it is open for ballot submissions. This occurs in the time range between its start and end date.

Completed – when the poll end date has expired and therefore no votes can be registered.

Validated – after completion, when the assigned returning officer has confirmed the poll results.

Runoff – after completion, when the assigned returning officer has declared the poll as undecided.

Backed-up – after validation when a poll back up has been exported by the administrator.

Under the first three status types a poll is considered active, when instead it has either of the latter three status it is classified as an inactive poll; no changes can be made to it.

The task of an administrator in managing polls revolve primarily around creating and assigning polls to Returning Officers, exporting and importing self contained poll backups and creating runoff polls.

To manage polls, starting from the Administrator Home Screen, you must click on manage polls. The Manage Polls Screen will be displayed as in Figure 8.3.

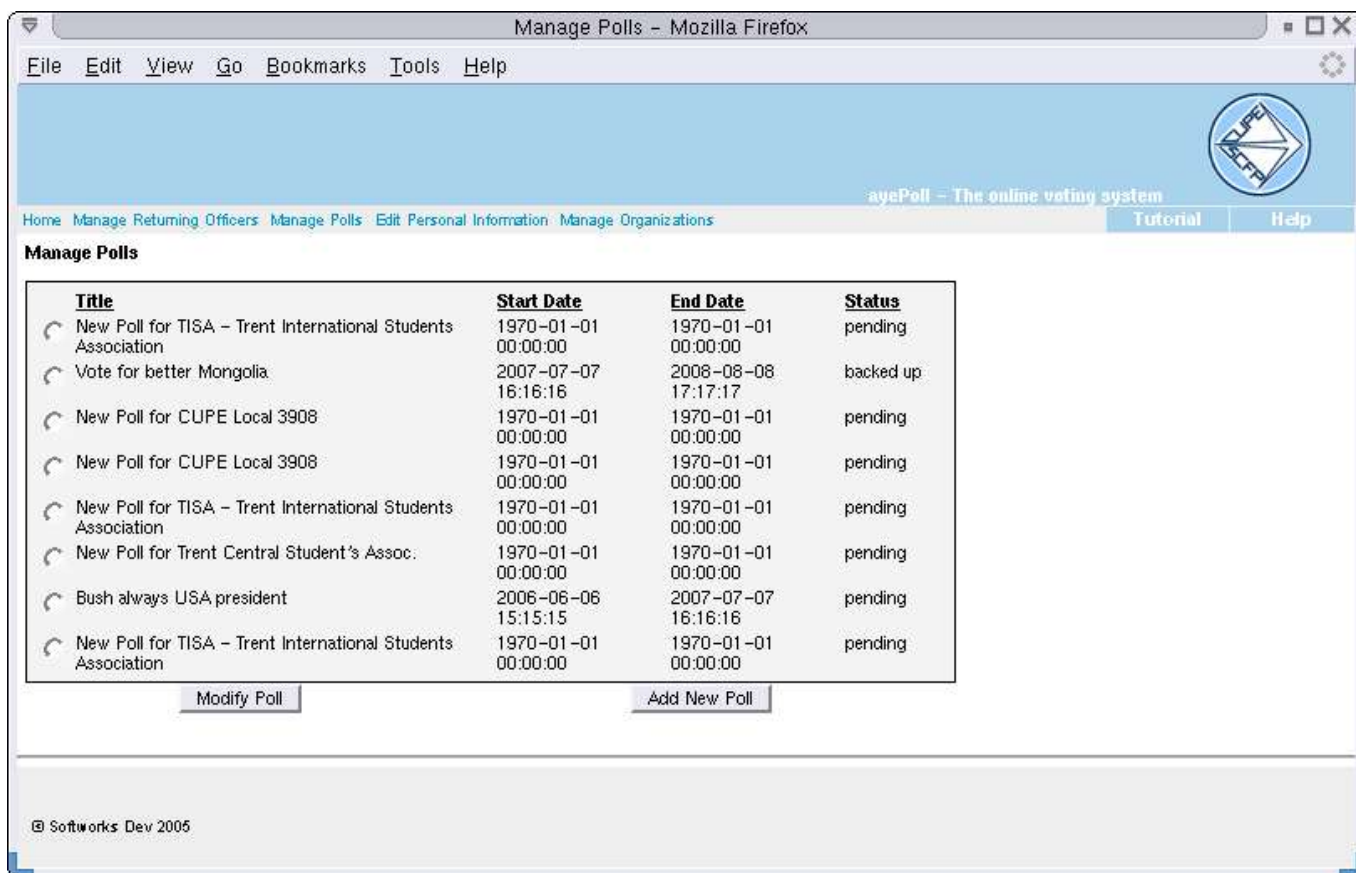


Figure 8.3: The Manage Polls Screen

8.2.1 Adding or Modifying Polls

To add a poll, from the Manage Polls Screen above, you must:

1. Click on the button labeled "Add new poll".
2. A pop-up window will appear where you will have to choose an organization from the drop-down menu which will run the poll. After you choose organization click "Continue" button if you want to continue or "Cancel" button if you want to cancel. (Figure 8.4).
3. You will be taken to the Add/Modify Poll Screen as in Figure 8.5.
4. In this screen, select the returning officer to be assigned to the poll, the poll scrutineers and minimum number of confirmations for the results to be accepted. If you want to save this information click "Save" button or "Cancel" button to cancel it.

To modify a poll, from the Manage Polls Screen, you must:

1. Select the poll name from the poll list.
2. Click on the button labeled "Modify Poll" and you will be taken to the Add/Modify Poll Screen as in Figure 8.5.
3. In this screen, select the returning officer to be assigned to the poll, the poll scrutineers and minimum number of confirmations for the results to be accepted. If you want to save this information click "Save" button or "Cancel" button to cancel it.

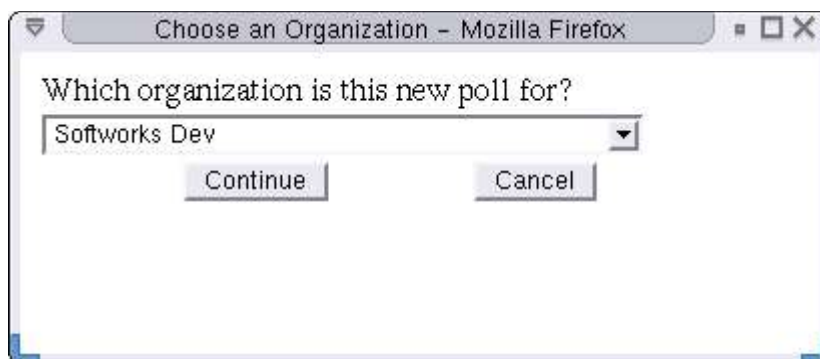


Figure 8.4 Choose Organization Screen

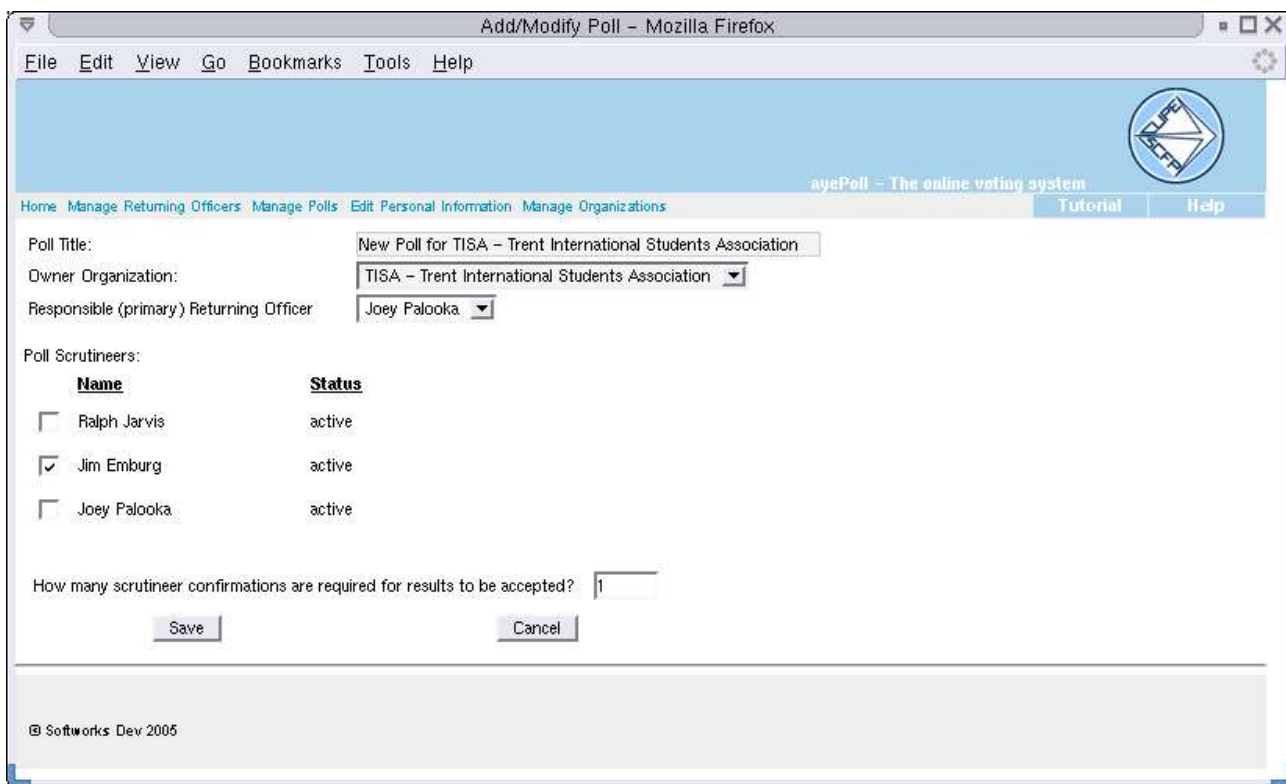


Figure 8.5 Add/Modify Poll Screen

9 Personal Information

Your personal information includes your name and contact details. This information is displayed in the login page and returning officers tasks screens so they can contact you if they need your assistance. It is important to keep this information always up to date, especially your e-mail address as the system also uses this to notify you of critical events in the system: the system will, for example notify you whenever it detects that it is running out of disk space, and thus require your action to ensure that ongoing polls are not interrupted.

9.1 Modifying this information

To keep your information up to date, starting from the Administrator Home Screen (Figure 8.1) you will:

1. Click on “Edit Personal Information” and the Edit Personal Information Screen will be displayed as in Figure 9.1.
2. Your current information will be displayed. You may choose to edit some or all of it.
3. When done changing your information click on the button labeled “Save” and your information will be updated.

Change Personal Information - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

ayePoll - The online voting system

Home Manage Returning Officers Manage Polls Edit Personal Information Manage Organizations Tutorial Help

Account Properties:

Username:

Password:

Confirm Password:

First Name:

Last Name:

Contact Information:

Email:

Telephone:

Street Address 1:

Street Address 2:

City:

Province/State:

Postal/Zip Code or P.O. Box:

Country:

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Figure 9. 1 Edit Personal Information Screen

10 Manage Organizations

Administrator is also responsible for managing organizations which run the polls using **ayePoll** system. He is able to add and modify them. To do so he must:

1. From the Administrator Home Screen as in figure 8.1 click on “Manage Organizations” button.
2. It will take you to the “Manage Organizations” screen. (Figure10.1)
3. To add new organization enter its name in the field labeled “Organization name” and click on “Add Organization” button. To change organization name administrator should select its original name from the list, enter new name in the “Organization name” field and click “Modify Selected” button.

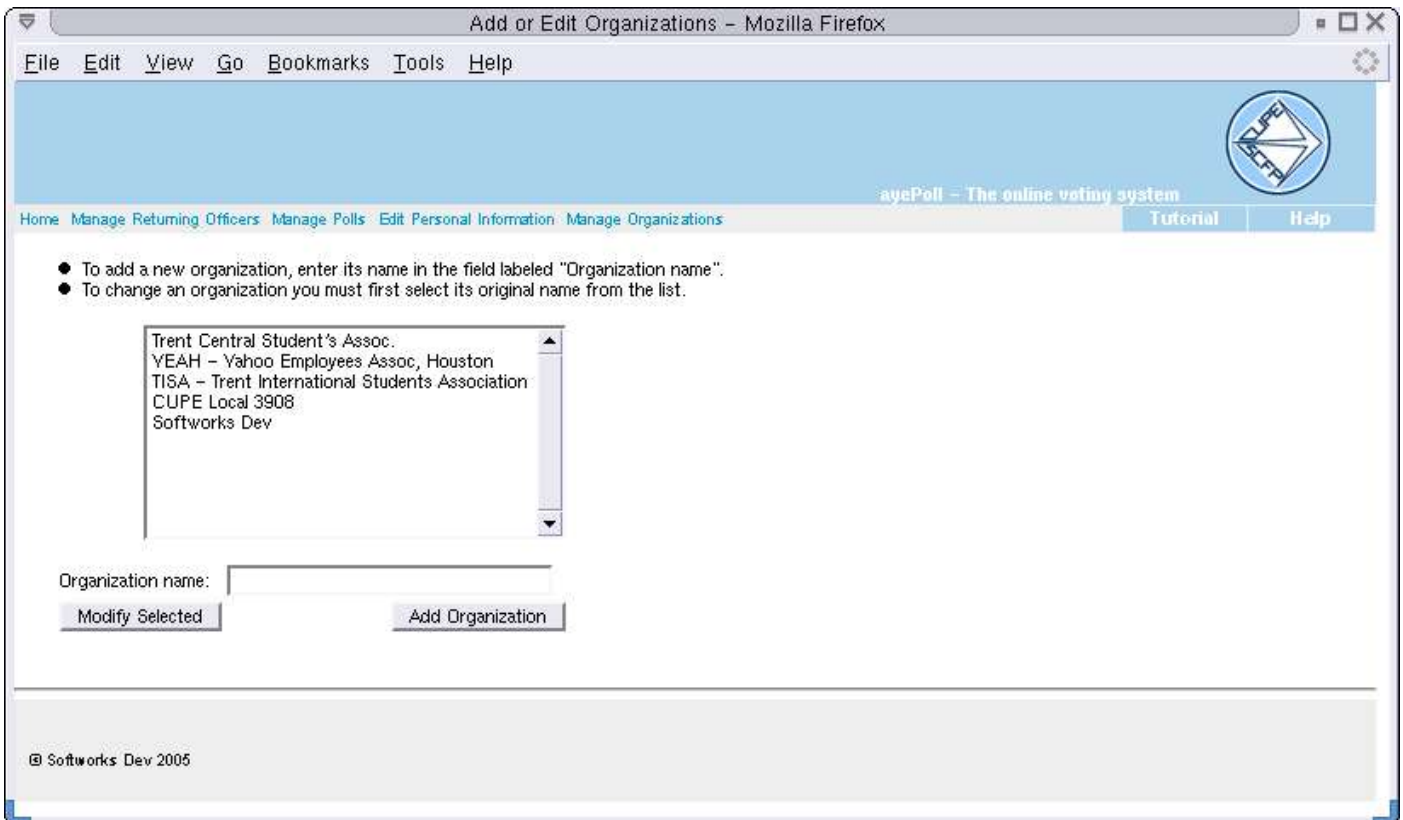


Figure 10.1 Manage Organizations Screen

11 System Health CheckList

As the administrator you are responsible for ensuring that the system runs correctly. In doing so you shall:

- Ensure that there is enough storage space for current and future polls
- Make backups of the disk in which the system runs
- Export backup of polls whenever these finish
- Periodically analyze system logs looking for messages that warn of exceptional events
- Ensure that the server in which the system runs is secured
- Maintain a strong password that is difficult to guess
- Ultimately, your discretion will be needed to assess the safety of the system.

12 Troubleshooting

Failure to login

There are two primary causes for this problem: username or password you enter incorrect or you account is temporarily blocked.

If the message you get from the system is that the username or password is incorrect, you must make sure that you are entering the correct combination as well as that you enter these in their proper case. Usernames and passwords are case sensitive, meaning that an upper case letter must always be entered as upper case. If you are still unable to login after these considerations, the only remaining solution to this problem is by physically accessing the computer in which the system runs and activating the administrative re-set application. This cannot be done from a web browser.

The second source of this type of problems is when an individual has made five failed attempts to login to the account within a 24 hour period. In this scenario the account will be disabled for a period of 24 hours by the system. Two solutions are available: you can either wait for the 24 hour period after which the account will have been re-enabled or you can access the system physically and activate the administrative re-set application. This cannot be done remotely from a web browser due to security considerations.

Failure to create a poll

You may be unable to create a poll if this results in the system consuming disk space above its set hard quota. You will be notified to backup the old polls in order to free up disk space.

13 Uninstaling

If you no longer wish to have **ayePoll** installed on your system, you can uninstall it by following these steps:

1. Login to the machine in which the system is installed as the root user.
2. Issue the command 'dpkg -r ayepoll'. The system will be uninstalled, the database will be removed as well as the database user account.

14 Summary

This manual has described the role of the administrator in the **ayePoll** Online Voting System. It provides considerations that an administrator must take into account in the operation of the system, a step-by-step guide in how to accomplish tasks and troubleshooting information. It is important that you fully read this manual before running the **ayePoll** system and keep it always at hand for reference.