

# **Reneal International Education Outreach Incorporated**



**Ubuntu 16.04 System Administration Manual**  
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## Acknowledgments

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## 1. FORMATTING CONVENTIONS

This Font	Represents
Lucida Console	User input and system output
Lucida Console <b>Bold</b>	User input that should be entered as shown
<i>Italics</i>	Variable text that should be replaced by the correct value

## 2. SYSADMIN PREREQUISITE KNOWLEDGE

### 2.1. Accounts and Passwords

In this manual, four types of accounts and passwords will be discussed.

**Student Account:** These are generic accounts with a user name of **student#** where # is the number of the computer the student is using. The password for each of these accounts is **student**. These student accounts can only access student files.

**Teacher Account:** These are individual accounts created for each teacher. The user name is the first initial of the teacher's first name, and underscore, and the teacher's family name. For example, a teacher named Jane Doe would have a user name of **j\_doe**. The password is set as the teacher's birthdate. The format of the birthdate is DDMMYYYY (if Jane Doe's birth date is February 7, 1980, her password is **07021980**). Teacher accounts can access their own personal files, files in the Teachers Shared area, files in the AllUsersShared area, and student files in client\_home\_students. There are also generic accounts with user names of **teacher#** (the password is also **teacher#**) that can be used by teachers who are guests. Students should not be allowed to use these accounts. In this manual, your own teacher's account will be referred to as your personal account.

**System Administration Account:** This is the account that you will use only for system administration tasks. The user name is sysadmin. Please protect the password for sysadmin! The sysadmin password should never be shared except with those IT teachers authorized to perform system administration. The sysadmin account allows for access into all files, and thus should be used very carefully to avoid damage.

There are certain powerful commands that require you to be a "superuser", also shown as "su". First you must be logged in as sysadmin to do these. When you perform those commands, you must first type "sudo" and then the command. It will ask you for a password, and you can enter the sysadmin password. This special step of using "sudo" and entering the password helps to avoid mistakes and accidental commands. It also protects the main-server if you forget to log out from sysadmin. ALWAYS USE CAUTION WHEN USING sudo, PERFORM ONLY THE TASKS THAT YOU MUST DO AS A SUPERUSER.

### 2.2. Logging In and Out of the Sysadmin Account

**Note:** Log in as sysadmin only when you need to perform sysadmin tasks. Otherwise, use your personal account

#### 2.2.1. Log In to the Sysadmin Account

1. Go to main-server.

2. At the log in prompt, use sysadmin as the account name.
3. At the password prompt, use the sysadmin password.

### 2.2.2. Log Out of the Sysadmin Account

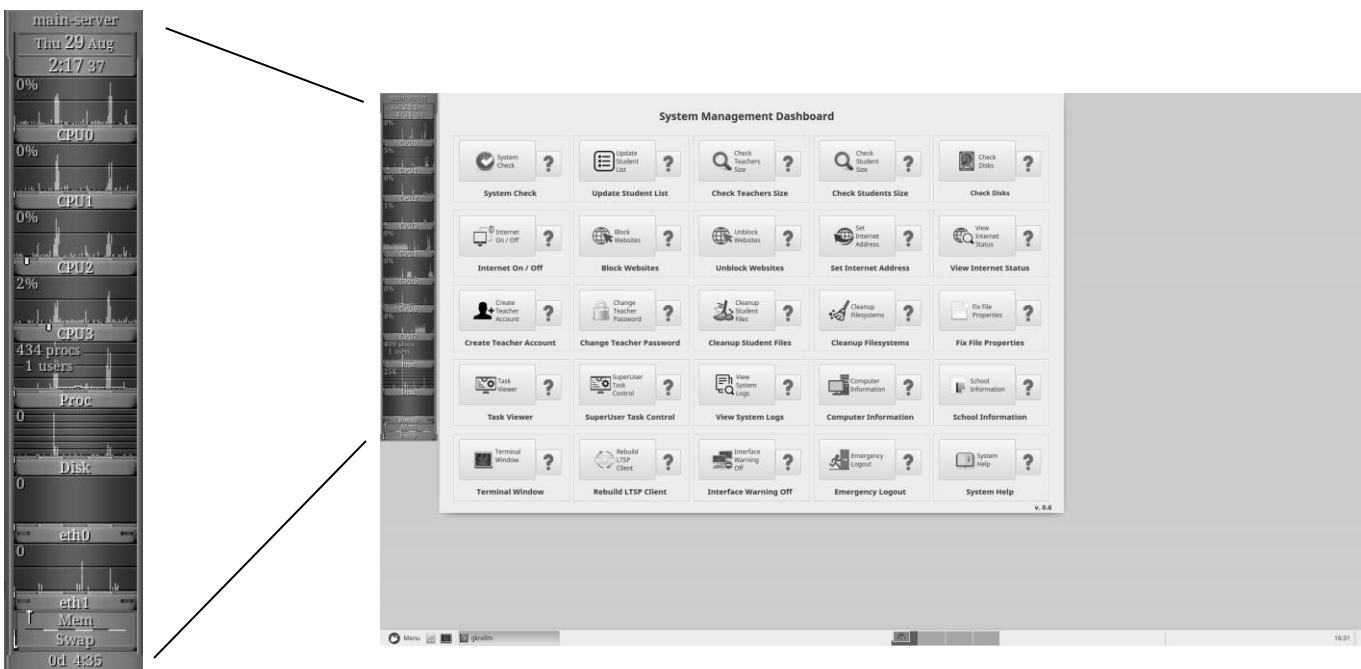
As soon as you have completed your sysadmin tasks, log out of the sysadmin account.

**Caution:** Never leave the sysadmin account logged on when you are not using the account. Other users may accidentally use the account and damage the system.

1. At main-server, go to the sysadmin menu at the upper right corner of the display and select Log out.
2. If the normal logout does not work, go to the System Management Dashboard and choose the button **Emergency Logout**.

## 2.3. Sysadmin Desktop

When you log in as sysadmin, you will see the sysadmin desktop. This desktop has the usual applications for the system, but it also has some special features only for system administration use. One main feature is the System Management Dashboard, described in Section 2.9



Another important tool is the System Activity Monitor. This is shown at the left. It can be used to check the state-of-health of the system and also to troubleshoot problems. The four CPU graphs (CPU0, CPU1, CPU2, and CPU3) show the current processor loading. The network graphs (eth0, eth1) show the network activity on the two LAN cards within the main-server. The graph labeled “Disk” shows the disk activity.

The System Activity Monitor is a good way to identify if there is something unusual going on – either too much or too little activity for the CPU, disk, or network.

When you log in as sysadmin, the System Activity Monitor will open automatically. If it does not, you can start it from the Applications Menu, System, Gkrellm System Monitor.



### 2.3.1. How to Open a Terminal Window

On main-server, the terminal window is used to enter many of the sysadmin commands. The system maintains a history of the commands entered in the terminal window even after you close the terminal window or log out of the sysadmin account.

1. To open the terminal window, go to the System Management Dashboard and choose the button **Terminal Window**.

### 2.3.2. Cancelling a Command in the Terminal window

When entering commands in the terminal window on main-server, you may accidentally enter the wrong command or the command may generate information on the screen that you need to stop. To stop a command or a display of information:

- Press the Ctrl key and the C key at the same time (Ctrl-C).

### 2.3.3. How to See Commands that Have Been Entered in the Terminal Window

- At the terminal window prompt, click the Up arrow to see past commands. You can click the Up arrow as many times as you need to.

### 2.3.4. Repeating a Command You Have Already Used

To save time and prevent errors, you can quickly repeat a command.

1. At the terminal window prompt, click the Up arrow until you see the command you want to repeat.
2. Press Enter to run the command.

### 2.3.5. Editing a Command

If you repeat a command but need to change part of the command before using it or you enter a new command but notice a typo, and you haven't yet pressed Enter, you can edit the command.

At the command line, use the Left and Right arrows to go to the part of the command you want to edit.

- To delete text, use the backspace or delete key.
- To enter new text, use the Left or Right arrow to move the cursor to the correct location, then type the text.

### 2.3.6. Some Common Linux Commands

ls	list the files in a directory
cd	change directory
sudo	superuser action
cp	copy
rm	remove (delete)

df -h      check disk free space with easy-to-read file sizes

ping        send a network ping

ifconfig    view network interfaces

man        manual listing that gives help for any command (for example, **man 1s**)

### 2.3.7. Editing a File in Linux

You can edit a file in Linux using a command line editor such as vi or nano. You can also use a window-based editor such as gedit.

#### **Steps**

1. Log in as sysadmin.
2. To open a file *filename*, type the command **gksudo gedit filename**
3. This will open the file. You can then edit it and save it.

### 2.4. Automated Backups

All user data is automatically backed up. At sites where computers are not shut down every day, the backups are performed automatically at midnight. At sites where computers are shut down at the end of the day, backups start automatically the next day when the computers are started again. Please note that the system may operate slowly while this backup is occurring.

The status for the backup is reported in the log file stored at `/var/log/mirror/mirror.log`.

The following copies are made during each backup.

- sdb2 to sda3
- sda2 to sdb2
- sda7 to sdb8
- sda6 to sdb7

Please note that sdb3 is minimally disturbed, so it will always contain the original copy of the operating system. Only the passwd and shadow files and a list of users are updated on sdb3 during each system backup.

The purpose of the backup is to allow for immediate recovery of the entire system if the main hard disk fails. It is important to note that the backup process creates an exact duplicate copy. Thus if a file is deleted, it will not be retrievable after the next backup is completed.

### 2.5. ~~–Section deleted–~~

### 2.6. How to Stop a Linux Process or Application

Sometimes a program or process does not stop as expected which causes performance or user problems. In these cases, users can stop the process.

1. On the computer where the process is running, go to the Applications menu and select Accessories then Task Manager.

2. A new window will open. This window shows the processes that are currently running.
3. Click the left mouse button on the process that you want to end.
4. Click the right mouse button and select "Terminate".
5. The process ends.
6. If the process does not end, log out and log back in again.
7. To restart the application, open it again.

## 2.7. Partition and Directory Structure

The main-server disks are partitioned in a very specific way. This is shown in the diagram below.

Primary Disk (sda)	Secondary Disk (sdb)
UEFI Boot (sda1)	UEFI Boot (sdb1)
OS Main (sda2)	OS Copy 2 (sdb2)
OS Copy 3 (sda3)	OS Copy 4 (sdb3)
Client Home (sda7)	Client Home (sdb8)
Client Home Students (sda6)	Client Home Students (sdb7)
Swap (sda4)	Swap (sdb5)
Squid (sda5)	Squid (sdb6)
	Emergency OS (sdb4)

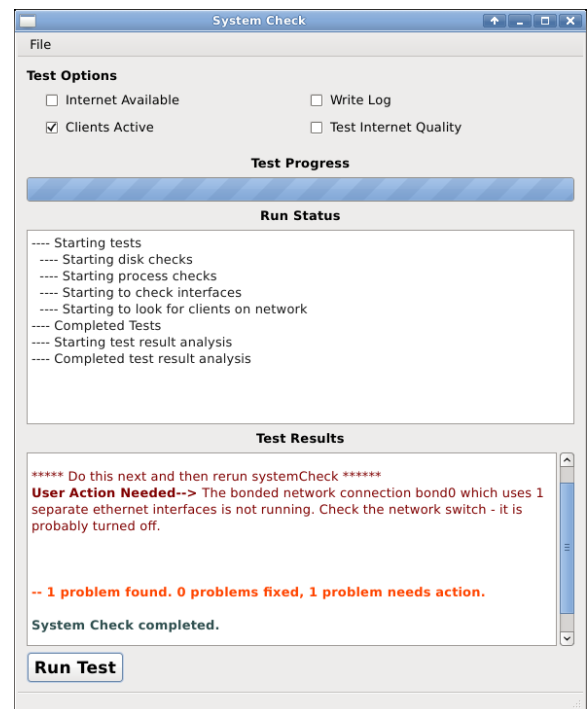
See Appendix B for more information about the directory structure for some of these partitions.

## 2.8. The systemCheck Command

**IMPORTANT:** The program systemCheck will identify and possibly fix many problems. ALWAYS TRY TO RUN THIS PROGRAM FIRST BEFORE TRYING TO FIX PROBLEMS. If the main-server is running and you can log in as sysadmin, go to the System Management Dashboard and choose the button **System Check**.

Below is an example output from the System Check app. In this example there was no network connection made to any of the LAN cards in the main-server, so systemCheck reported that fact and also that there was no internet connection. Note that the command also gives some ideas for fixing any problems that are reported.

See Appendix B for a detailed description of the systemCheck program and its capabilities.

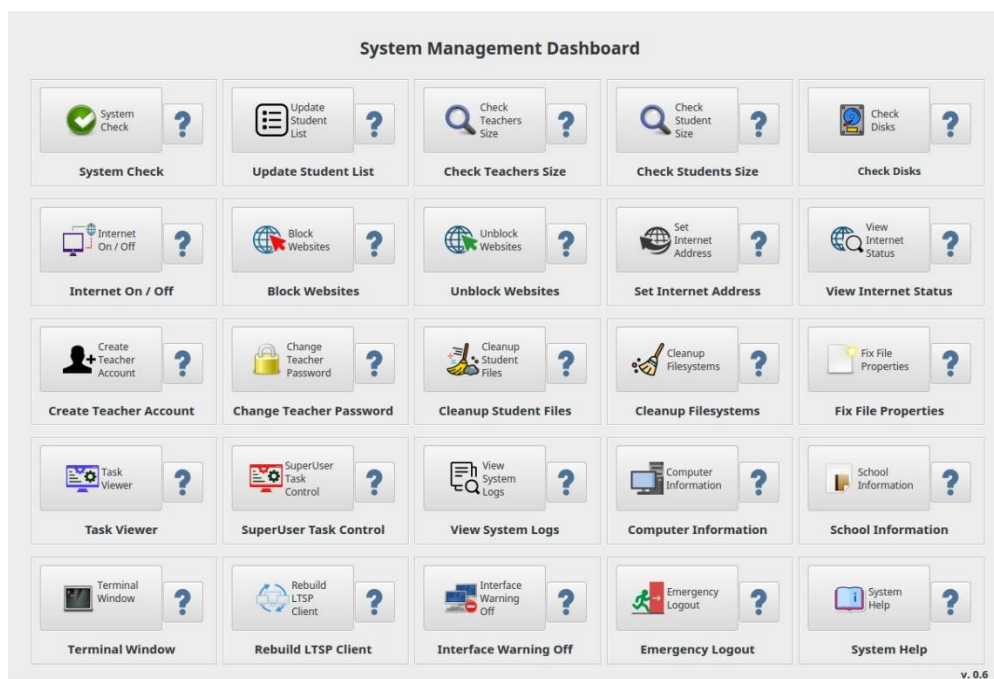


## 2.9. System Management Dashboard

The Reneal system has many apps to help the school system administer (Super User, or SU) perform their different tasks. The main responsibilities of the SU are to monitor the Reneal system health, manage teacher and student accounts, control internet usage, and troubleshoot and repair problems with the help of the Reneal Team.

The System Management Dashboard provides all of these apps in one place that is always available on the desktop when the SU signs into the sysadmin account. It replaces some commands that were formerly found in the “System” menu and some commands that were executed on the Linux command line. Having these apps on the System Management Dashboard should be much easier for the SU to use now. Use just a single click with the left mouse button to start an app.

When the SU single-clicks one of the apps on the dashboard, they will get a small information window explaining what that app does. They can also click the “Help” button beside each app to get more information and a video about the app. The System Help app gives assistance for all of the Dashboard buttons.



See Appendix C for a complete description of each app included in the System Management Dashboard.

## 3. TEACHER SUPPORT TASKS

### 3.1. Add a Teacher Account

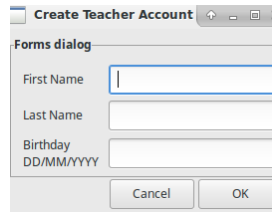
Perform this task as needed to add a new teacher account.

#### *Before You Start*

1. Log in as sysadmin.

### ***Steps***

1. To add a teacher account, go to the System Management Dashboard and choose the button **Create Teacher Account**.
2. Enter the sysadmin password.
3. The program will ask you for the first name, last name, and birth date of the teacher. The window is shown below. The format for entering the birthdate is DD/MM/YYYY.



4. Type in the first name, last name, and birth date of the teacher.  
  
For example, type **Gift** when prompted for the first name, **Molle1** when prompted for the last name, and **21/02/1980** (for February 21, 1980) when prompted for the birth date.
5. The program will ask you to confirm the information that you have just typed.
6. The teacher account will be created. The program will show the user name (**g\_molle1**) and password (**21021980**) for the new teacher account.
7. Confirm the account was created correctly:
  - a. Log out of the sysadmin account.
  - b. Log in to the new teacher account.
  - c. Confirm the standard teacher account display appears.
  - d. Open the Documents folder window by double-clicking the Documents folder.
  - e. Confirm the teacher's name appears in the title of the Documents folder window.
  - f. Log out of the user account.

### **3.2. Reset a Password for a Teacher Account**

Perform this task as needed to change the password of a teacher account.

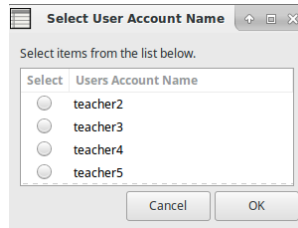
#### ***Before You Start***

1. Log in as sysadmin.

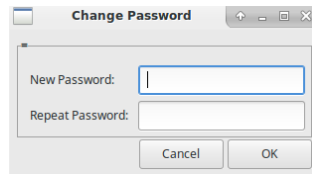
### ***Steps***

1. To change the password of a teacher account, go to the System Management Dashboard and choose the button **Change Teacher Password**.
2. Enter the sysadmin password.

3. The program will ask you for the account name of the teacher; an example is shown below. Select the account and then click “OK”.



4. The program will ask you for the new password for the teacher’s account. Type in the new password for the teacher’s account. You will also need to retype the new password to confirm it. When you are finished, click “OK”.



5. The system will display password updated successfully.

If the system displays the message sorry passwords do not match, there was an error when you typed the new password. Start over at Step 1.

6. Log out of the sysadmin account.

### 3.3. Restoring a File for a Teacher

If a teacher deleted a file since the last daily backup and needs to use it, you can restore the file for the teacher.

**Note:** If the teacher deleted the file before the last daily backup there is no way to recover the file.

#### **Before You Start**

1. Log in to main-server as the sysadmin.
2. Open the terminal window if it isn’t already open.

#### **Steps**

1. At the terminal window prompt, type **sudo mount /OS\_Copies/ClientHomeCopy** and press Enter.
2. Log out as sysadmin
3. Ask user to log in to their account.
4. Double-click the File System icon on the desktop.
5. From the File System, double-click OS\_Copies.
6. From OS\_Copies, double-click ClientHomeCopy.
7. Double-click user’s directory.
8. Ask the user to navigate to the file they want to recover in their directory.

9. Select, right-click file and select Copy.
10. Select File System in the left navigation area of window.
11. Go to /client\_home then go to the user's home directory and Paste the file.
12. Log out as the user.
13. Log in as sysadmin.
14. Terminal window prompt, `sudo umount /OS_Copies/ClientHomeCopy` and press Enter.
15. Log out.

### **3.4. –Section deleted–**

### **3.5. Changing Permission for a File**

Sometimes a teacher will get a message saying they do not have permission to open a file. Only the owner of the file can change the permission, so the teacher will need to ask that person to change the file permission.

To change the permission for a file, the owner of the file logs in to their account. Then they use File Manager to navigate to the file. They must right-click on the file icon, then choose “Properties”. A new window will open, and they should choose the “Permissions” tab. This will show the current permissions and allow the owner to change them. The owner of the file is shown at the top.

The owner has the option of giving “Read only” permission or “Read & Write” permission to other teachers. First, make sure “teacher” is shown as the “Group”. The file owner can then choose either “Read only” or “Read & Write” in the “Access” option pull-down menu.

You can also do this for an entire folder, again by right-clicking on the folder, selecting “Properties”, and then the “Permissions” tab. When you select the “Access” option you want (either “Read only” or “Read & Write”), it will open a new window titled “Apply recursively?” This means, do you want to apply that permission setting to all files in the folder? Usually you would say “Yes”.

Note that if you open a file that is “Read only”, it will say so at the top beside the file name. You will not be able to make changes to a “Read only” file. However you can usually save it to another file name using the “Save as” command and then make the changes that you want.

### **3.6. Using the ManageClasses Program**

The Manage Classes program is for teachers, and it allows them to manage and review assignments very easily. They will be able to see what students have not completed an assignment yet, and they will be able to review each student's output with a simple double-click. [NOTE: There are videos explaining how to use Manage Classes in Teachers Shared, in the /Shared/ManageClasses folder.]

For this program to work, the IT teacher must already have created an up-to-date Student Name List and stored it in /client\_home/share/student\_list.csv for the current school year. See Section 4.2 for how to create a Student Name List.

Before a teacher uses the Manage Classes capability, they will need to identify each of their classes. This is called “Creating a Class”. This must only be done one time each school year. Then they will identify which students are in each of their classes. This is called “Assigning Students to a Class”. This too is done only one time each school year, although students can be added or removed at any time during the school year as needed.

For many cases, assigning students to a class will just be identifying a Form and Stream. However sometimes teachers have classes that combine students from several different streams or even students in different Form levels. This program allows teachers to do either of these – either pick a Stream, or identify students from different Forms/Streams that are in a class.

Once teachers have created classes, they can create assignments to give to the students. For each assignment, the teacher will tell the students the file name to use for that assignment. The teacher will create a unique file name for each assignment. This is called “Creating an Assignment” and can be done as many times as a teacher wants during the school year. Note that the teacher must create an assignment for every class they have. So if they have five streams of Form 1 Math and want to give them all the same assignment, they must create an assignment for each class.

Teachers can also create assignments that are projects, where there may be more than one file that the student must complete. In this case, the teacher will tell the students the folder name to use for that assignment.

By telling the students the exact file name to use (or exact folder name, for projects), the program can then identify which students have begun that assignment and which students haven't. The teacher can also, from a single window, double-click on each individual student's name to review their work. This is called “Grading Assignments”.

For cases where students are working in groups, just have the group leader save the file for the group using the exact file name or folder name, so the teacher can easily find it in the list.

To use the program, do the following:

- Log in using your own teacher account
- Go to the “Start” button
- Choose “Office”
- Choose “Manage Classes”

The following four sections described in detail how to do each of the four steps: creating a class, assigning students, creating an assignment, and grading an assignment.

### **3.6.1. Creating a Class**

Create a class – you only need to do this once at the beginning of the school year for each of your classes. This may be a stream, but it could also be a class with students from more than one stream that meets at the same time.

- If you're on the “Choose Task” page, click your left mouse button on “Create Class” [you can also click on the “Create Class” tab].



- Select your own account using the pull-down button in the Teacher option.
- Next type in the name of the class. It is up to you to decide how to name your classes, but we suggest including a subject and form level. If it is a single stream, you would also want to include the stream name. An example would be “Math Form 2 B”.
- Add a description if you want.
- Make sure to click the “Save” button when you are finished – if you click “Cancel” or click on another tab, your work will be lost.

### **3.6.2. Assigning Students to a Class**

Assign students to a class – you do this at the beginning of the school year for each of your classes, but you can always add or remove students later if you need to.

Before you do this step, you must have completed the “Creating a Class” step!

- If you're on the “Choose Task” page, click your left mouse button on “Assign Students” [you can also click on the “Assign Students” tab].
- Select your own teacher account, and then select the name of the class that you want to assign students to.
- How to add all of the students in a stream:
  - Click on the “Add/Remove Students” button – this will open another window
  - Choose Form, then choose Stream [This will list all of the students for that form and stream that are currently encoded in your student\_list.csv file]
  - Click “Select All” – all of the students will be selected [If you've made a mistake, you can click “Clear All”]
  - Then click “OK”
  - You will see all of the students in that stream get added to the list of students in the class
  - When you are finished assigning all of the students, be sure to click “Save”. If you click “Cancel” or click on another tab, your work will be lost.
- How to add some (but not all) students in a stream:
  - Click on the “Add/Remove Students” button – this will open another window that has all of the students in your current “student\_list.csv” file.
  - Choose Form, then choose Stream.
  - Click on the name of the student(s) that you want to add. When you click on the student's name, you will see a check show up in the checkbox. [If you make a mistake, just click again on the student's name and the check will disappear from their checkbox. If you want to start over, just click “Clear All” and all of the checks will disappear.]

- When you have selected all of the students that you want, click “OK”.
- Repeat selecting different streams and clicking on students’ names until you have selected all of the students that you want.
- When you are finished assigning all of the students, be sure to click “Save”. If you click “Cancel” or click on another tab, your work will be lost.
- How to remove a student:
  - Click on the “Add/Remove Students” button
  - Choose Form, then choose Stream of the student that you want to remove
  - A new window will open with the students from that stream – you can see the ones that are selected because they will have a check in the checkbox
  - To remove a student, just click on the name of the student that you want to remove, and the check will disappear from their checkbox.
  - You can select as many students as you want to remove.
  - When you are finished, click “OK”.
  - When you are finished removing all of the students you want to remove, be sure to click “Save”. If you click “Cancel” or click on another tab, your work will be lost.

You can add or remove more students at any time during the school year.

### **3.6.3. Creating an Assignment**

Each time you give an assignment to the students, you must create an assignment name for them to use as their file name so their inputs will be gathered properly into one place for you.

Before you do this step, you must have completed the “Creating a Class” and “Assigning Students to Classes” steps!

- If you're on the “Choose Task” page, click your left mouse button on “Create Assignment” [you can also click on the “Create Assignment” tab].
- Select your own account, and then select the name of the class that you want to create an assignment for.
- Type in your assignment name (it will show the assignments you have already given). Then hit the “Enter” key.
- Now type in the file name that you want the students to use for their assignment. Then hit the “Enter” key. The file name must include the extension (such as .odt, .xls, .jpg, etc.). This cannot be changed later. The students must use exactly this file name when they save their work, and the file name is case sensitive. For example, if you say the file name is “Essay 1.odt”, each student must save their essay with the file name of “Essay 1.odt”.

- Please note that most programs (such as LibreOffice Writer) will automatically add the file extension to the file name – the student will not need to encode the extension.
- There is also a checkbox in the Create Assignments window called “Is Project”. If you use this checkbox, you will enter a folder name instead of a file name. You would use the “Is Project” checkbox if the student was creating multiple files for their assignment, instead of just one file. This folder should be created by the students as a sub-folder in their Projects folder. They can then save all of the files they create in this folder for easy review and grading by the teacher.
- In summary, if the assignment is just a single file, don't click the “Is Project” checkbox and enter a file name with extension (that file must be stored in the student's Documents folder).

If the assignment requires multiple files, click the “Is Project” checkbox and enter a folder name (that folder must be created in the student's Projects folder, and the files stored in that folder).

- You can then add a short description of the assignment if you want.
- When you are finished, be sure to click “Save. If you click “Cancel” or click on another tab, your work will be lost.

Please note: if you add a new student after you've created an assignment and you want that student to do the assignment, you will need to open that assignment again (using “Create Assignment” and click on the existing assignment) and click “Save” and then that new student will get that assignment, plus any future assignments that get created.

Once you have created an assignment, you must tell the students to save their work either in their Documents folder or their Projects folder, depending upon what you selected. You should tell them the exact file name or folder name to use, and please emphasize to them that the file name or folder name must be exactly the same as the one you give them. Please remember that it is case sensitive. For the above example, they should save their essay as “Essay 1” in LibreOffice Writer, which will automatically add the .odt extension. The students will then work on their assignments.

If the student uses the wrong file name or extension, or the wrong folder name, their work will not show up as “Completed” – it will continue to be in the list of “Uncompleted” assignments.

### **3.6.4. Grading Assignments**

Once you have made an assignment, you can review them very easily for each student. The program will also show you what students have not yet started the assignment.

- If you're on the “Choose Task” page, click your left mouse button on “Grade Assignment” [you can also click on the “Grade Assignment” tab].
- Select your own teacher account, and then select the name of the class and the name of the assignment that you want to grade.
- It will now show you the students that have completed the assignment. If you want to look at a student's output, just double-click on their name and it will open their file (or folder, for a Project). When you are finished looking at their assignment, just close the file. You can then open another student's file.

- Click “Finished” when you are done grading.

## 4. STUDENT SUPPORT TASKS

Students sign in to a student account using a generic user name, for example student1. When a student logs out, the account they used is deleted and rebuilt. This is so students always get the same standard user interface, no matter who has used the account before them.

The first thing a student will see when logging in using a generic user name is a sign-in screen. This screen allows the student to choose their Form, Stream, and Name. In order for students to be able to save their files, their names must be entered in a Student Name List. These names are displayed (by Form and by Stream) whenever a student account is used to log in.

Files created by students are saved in the `client_home_student` directory. The very first time a student signs in at the beginning of the school year, the server will automatically build a folder in this directory for each student. Within `client_home_student`, the files are organized first by a folder for each Form, and then within those, folders for each Stream. Finally, there is a folder with the name of the student.

Please remind your students that they should never save files on the desktop, since the desktop is always deleted and rebuilt when they log out. Files should only be saved in either Documents or Projects, which are stored in their individual student folder.

At the beginning of each school year, the computer teacher should archive the files from the last school year. This is described in Section 4.1 below. Then they must create the new Student Name List with students’ names along with their form and stream so the students can sign in with their proper information. This is described in Section 4.2 below.

### 4.1. Archive Student Directories

At the beginning of each new school year, you should archive all of the student files that were created during the last school year. To do this, run the following command in the terminal window:

```
sudo endOfYearCleanup
```

This will copy the students’ files from last year into a folder called `/client_home_student/last_year`. It will then delete all of the existing folders in `/client_home_student/` in preparation for the new school year. This program also automatically archives the last `student_list.csv` file and creates a blank student list file for adding the student names for the new school year. Note that video, music, and photo files above a certain size will not be archived.

### 4.2. Create Student Name List File

After you have run `endOfYearCleanup`, then you can create the new Student Name List for the new school year.

The Student Name List has a very specific format and very specific headings. This file must be stored with the correct file name and in the correct directory. The easiest way to create this file is to use the **Update Student List** app program, which is described below. But first, here is some information about the Student Name List.

- The location and file name of the Student Name List is `/client_home/share/student_list.csv`

- The first row of the file must have the column names “First Name”, “Middle Name”, “Last Name”, “Form Level”, and “Stream” separated by commas. The form level entered into this spreadsheet must be in the form **Form X**, where X is the Form number spelled out as a word, (for example, **Form One**) .
- This file must be in csv format. A .csv can be created in LibreOffice Calc, just by choosing the .csv format when you are saving the file. You may get a message saying only one worksheet has been saved; that is okay.
- Note that if there is a field missing, such as a middle name, that is okay.

You can look at the Student Name List file in a text editor such as gedit (Linux) or notepad (Windows). Here is an example of what the file will look like.

```
First Name,Middle Name,Last Name,Form Level,Stream
Upendo,M.,Mollel,Form One,A
Shadrack,,Lazaro,Form One,B
Emmanuel,Noah,Tumaini,Form Two,A
```

The easiest way to create the students list is to use the **updateStudentList** program. This program allows you to use existing files that other teachers have already created, so you don’t have to do it again.

#### 4.2.1. Introduction to updateStudentList

An up-to-date Student Name List file is very important so that students can save their work in their own personal folder. The Student Name List file must also be updated to create classes with the Manage Classes program.

[NOTE: There are videos explaining how to use **Update Student List** app by clicking on the **System Help** app in the System Management Dashboard.]

While the Student Name List file (stored at */client\_home/share/student\_list.csv*) is simple in form, it can require much work to create from the various files that the teachers may give you or that can be obtained from a school database. The problem before was that these files with a list of students that you get from teachers are organized differently. Most computer teachers don’t have the time to do all of that special work to format it properly.

The app **Update Student List** will make the task much easier. It can take the files that the other teachers or a database give you and automatically do the proper formatting for you.

In the following two sections, the two parts of making the student\_list.csv file will be described. The first part is preparing the inputs using the soft-copy files that the other teachers give you. The second part is then running the app that processes that data automatically into the student list.

#### 4.2.2. Preparing the Inputs

First, you should ask the other teachers to give you the soft-copy file of the students in their stream. This can be just an Excel/Calc spreadsheet that they have encoded themselves or it can be from a database after it has been updated by the teachers. It doesn't matter what the format is.

Here is the process that you will use when you get a soft-copy file from another teacher or from a database:

1. As the teachers give you their soft-copy files, save them into the directory */client\_home/share/student\_source\_lists/YYYY*. YYYY means the year, for example 2023. Make the year directory as needed for each year.

2. You will now create an input file for the program from each soft-copy file that you get from another teacher or a database.

3. Open the soft-copy file for a stream. Then open a new spreadsheet.

4. First you will type column headings in the first row of the new spreadsheet that you just opened. The headings you type will depend upon the information that is in the soft-copy file you received from the other teacher. There are three main options:

a. The soft-copy file from the other teacher has the student's entire name in one column. For Tanzania, this is usually in the form "*firstname middlename lastname*" where there is no comma. For either of these cases, you will type the following headings in the first row in the new spreadsheet:

Name	stream	Form

As you can see, the headings can be capital letters or small letters or both, it doesn't matter.

b. The second option is that the other teacher's soft-copy file has the student names split into three separate columns: last name, first name, and middle name. For that case, you'll type the following headings in on the first row of the new spreadsheet:

Last	First	middle	stream	Form

c. The third option is similar, except the soft-copy file from the teacher has only two columns for the name (the middle name is either left out or combined with the first name). As you might guess, you'll type headings like this in the first row of the new spreadsheet:

Last	FIRST	stream	Form

Please note that sometimes the soft-copy file will have merged columns for the names. This is okay. Just type the headings for "Form" and "Stream" in columns to the right of where the name ends; you can leave the other columns blank. It might look like this:

Name						stream	Form

5. Once you have typed these headings in the new spreadsheet, you can copy the names of the students from the soft-copy file that the other teacher gave you and paste them into the new spreadsheet. The names might take 1, 2, or 3 columns, but the program will read the headings that you typed and will know what to do. If the boys'

names and girls' names are in separate columns, you will want to copy-and-paste both the boys' names and then the girls' names from the other teacher's soft-copy file into your new spreadsheet. Just continue the girls' names after the boys' names.

After you copy-and-paste, you may notice that your headings are not exactly in the right place. This is especially possible if the soft-copy file has merged cells. That is okay, just move the headings to the correct column once you start copying-and-pasting.

If the names came from a database, there may also be some empty columns that were hidden. There might also be some empty rows. This is OK, the program will clean them up. It does not matter if the names are in all upper case or have periods in them. These things also will be corrected by the program. Some examples of each are shown below.

*Good File: Entire student name in one column*

Name	Stream	Form
Goodluck Jackson Mollel		
Gift Grace Laizer		
samson franklin kessy		

*Note: Text case of names and headers unimportant. Special characters are OK. Names do not need to be in alphabetical order.*

*Good File: A list of names with empty columns and rows:*

Name			Stream	Form
Goodluck Jackson Mollel				
Gift Laizer				
samson franklin kessy				

*Note: empty columns and rows are OK*

*Good File: A list of names with merged columns:*

Name			Stream	Form
Goodluck Jackson Mollel				
Gift Laizer				
samson franklin kessy				

*Note: merged columns are OK*

*Good File: Four column from copy and paste of names that were in multiple columns*

Last	first	Stream	Form
Mollel	Goodluck Jackson		
Laizer	Gift		

*Note: last and first name columns with header.*

*Good File: Five column from copy and paste of names that were in multiple columns*

Last	First	Middle	Stream	Form
Mollel	Goodluck	Jackson		
Laizer	Gift			

*Note: last, first, and middle names columns with header.*

6. Now you have to tell the program the stream and form of these students. To do that, you need to type the stream name and form in only the second row (right below the headings). The program will automatically assume that every student after that has the same stream and form, until it finds a row that has a different stream and form typed in the list. Here are some examples, using the headings shown above.

Please type the stream name with capitalization that you like (only first letter capitals or all capitals), but be consistent so it looks nice.

*Good File: Entire student name in one column*

Name	Stream	Form
Goodluck Jackson Mollel	A	2
Gift Laizer		
samson franklin kessy		

*Note: Stream and Form only in first row.*

*Good File: A list of names with empty columns and rows:*

Name			Stream	Form
Goodluck Jackson Mollel			A	2
Gift Laizer				
samson franklin kessy				

*Note: empty columns and rows are OK*

*Good File: Four column from copy and paste of names that were in multiple columns*

Last	first	Stream	Form
Mollel	Goodluck Jackson	A	2
Laizer	Gift		

*Note: last and first name columns with header.*

*Good File: Five column from copy and paste of names that were in multiple columns*

Last	first	Middle	Stream	Form
Mollel	Goodluck	Jackson	A	2
Laizer	Gift			

*Note: last, first, and middle name columns with header.*

7. If you want, you can paste several streams into the same file. Put the new stream name and form beside the first name of the new stream and this student and all following students will be assigned to that stream until there is another stream and form entry, or the end of the file.



*Good File: Three column with multiple streams*

Name	Stream	Form
Goodluck Jackson Mollel	A	2
Gift Laizer		
samson franklin kessy		
GRECE F. JOSEPH	B	2
IKRAM I. ISMAIL		
JESCA P. LOGIRU	HGL	5
LEVINA A LOGIRU		

*Note: Multiple streams and/or forms are ok. Just put new stream and form beside the first student of the new stream or form. For this example, Mollel/Laizer/Kessy will be assigned to Form 2/Stream A, Joseph/Ismail will be assigned to Form 2/Stream B, and both Logiru's will be assigned to Form 5/Stream HGL.*

**Here are examples of BAD files that will not work.**

*Bad File – Stream Name Missing*

Name	Stream	Form
Goodluck Jackson Mollel		5
Gift Laizer		
samson franklin kessy		

*Note: At least one value for the stream and form must be in the file*

*Bad File – Form Column Missing*

Name	Stream
Goodluck Jackson Mollel	B
Gift Laizer	
samson franklin kessy	

*Note: a name, stream, and form columns must be in the file*

8. Finally, save your new spreadsheet using the .csv format. You should give it a filename that you can easily identify later – for example *stream-form.csv*. Save the file in the directory /client\_home/share/student\_source\_lists/YYYY, where YYYY means the school year.

*Make sure to put all of the teacher' files and your csv files in the same directory, /client\_home/share/student\_source\_lists/YYYY. This way you will have everything for the year in one simple-to-find place.*

Hopefully you will be able to get a soft-copy file for every stream, either from the teacher or from a database. However, if for some reason you don't have a soft copy, you will need to type in the names yourself. You may only want to type in the names for the students that will use the computers in class, to make it easier. You could type all of the names one row after another. In Tanzania, the name is usually typed as “*firstname middlename lastname*” (no comma) in the first column, *stream* in the second column, and *form* in the third column. Do not forget to type the headings in the first row.

### 4.2.3. Creating the student\_list.csv file

Once you have made csv input files for all of the streams that you want, you will run the program to create the student\_file.csv. The program will process all of the csv files for you to create a single student list in the correct format. It will also put the file in the proper place on the server (/client\_home/share).

1. Log in as sysadmin.
2. To run the program, go to the System Management Dashboard and choose the button **Update Student List**.
3. This will open a file selection window already set for the /client\_home/share/student\_source\_lists directory. Chose the school year directory where you have your .csv files. You will see only those files that have the .csv extension.
4. You may choose one or more files to process to add the students to the student list file, /client\_home/share/student\_list.csv. It does not matter if you have already used a file – all students that are already in student\_list.csv will not be added again, only new ones. Just like usual, you can hold down the CTRL button to choose more than one file at a time, or you can hold down the SHIFT key to select a range of files.

[Note: If you do this at the beginning of the school year with the last year's student\_list.csv still in the /client\_home/share directory, the program will automatically move that file to /client\_home/share/old\_student\_lists and rename it student\_list.csv.YYYYMMDD (for example, student\_list.csv.20160803). Then the program will create a new, empty student list.]

[Note: If you choose "Cancel" in the file selection window the program will show the number of students, streams, and forms that are already in the database.]

[Note: The program will also tell you if there are errors in your input file, like a missing "Stream" column.]

After you run the program, it will show you how many streams, forms, and total students are in your student\_list.csv file. You are finished! However, you should run the app again whenever you make changes in any of the csv files. Remember, it doesn't matter if you have already run the program on a file – only the new students will be added. So you can run the **Update Student List** app as many times as you want, as you get soft-copy files from the teachers.

### 4.3. Add a New Student to the Student Name List

To add new students to the Student name, you can always rerun the **Update Student List** app as described in the previous section with the additional students added to your .csv file. This is the preferred approach.

You can also add the new student's information (first name, middle name, etc.) to the end of the student\_list.csv and save the file. You can use Calc to open the file to make these edits. If the columns do not look right when you open the file, close it and then be sure to choose only Comma in the Text Import window Separator Options that pops up first when you open the file in Calc. After you have added the student save the file as file type .csv.

### 4.4. Cleanup Student Files

Especially for schools with internet, a concern is that students will download and/or store non-school-related files in their personal folder. If you see many files in the Personal File Size/Count list, you can use the **Cleanup Student**

**Files** app to remove inappropriate files. The **Cleanup Student Files** app allows the Super User to find and remove inappropriate files.

1. To remove non-school related files, go to the System Management Dashboard and choose the button **Cleanup Student Files**.
2. This app only shows students that have files that may not be appropriate (videos, music, and photo files over a certain size and any .exe/.iso files).
3. The Super User should review the list of files shown for each student, by clicking the “+” to the right of each student’s name.
4. For each student the Super User should tick the files that are appropriate and should be saved.
5. Once you click OK, all UNTICKED FILES WILL BE DELETED

Remember – you should tick the files that you want to save. Files that are not ticked will be deleted.

Students that have stored inappropriate files in their folder should be reprimanded.

## **5. PRINTER SUPPORT**

### **5.1. Add a Printer**

#### ***Before You Start***

1. Log in to main-server as the sysadmin.
2. Connect the printer to main-server.
3. Turn on the printer.

#### ***Steps***

1. Go to the Applications menu, select System and then Printing.

In the Printing window, the new printer appears. Typically, the printer name is the printer model number.

If the printer does not appear in the window, confirm that the connections are plugged in correctly and the printer is powered on. If you still do not see it, you may need to research it on the internet to look for a driver.

2. Click the printer once to select it. The icon is highlighted.
3. Go to the Printer menu and select Properties.
4. In the Properties window, change the Description of the printer to a name that will be easily understood by the users. For example, change MS430LAN to Room3 to indicate the printer is located in Room 3.
5. In the Properties window, click Print Test Page.
6. Confirm the test page prints.
7. In the Properties window, click Close.

## 5.2. Printer is Not Printing

### *Symptom*

The printer hangs or printing jobs do not print.

### *Resolution Steps*

1. Log in to main-server as the sysadmin.
2. Go to the Applications menu, select System and then Printing.
3. Look at the icon for the printer that is not printing.

If	Then
The printer icon has a red symbol	<p>The printer is not connected.</p> <ol style="list-style-type: none"><li>a. Restart the printer. If the printer doesn't power on:<ol style="list-style-type: none"><li>i. Make sure the printer is connected to power and to main-server.</li><li>ii. Turn on the printer.</li></ol></li><li>b. Check the printer for error messages or error lights. If there are errors, perform printer maintenance.</li><li>c. If the printer does not start printing jobs, go back to main-server and check the printer icon. If the icon is normal, go to Step 4.</li></ol>
The printer icon is normal	Go to Step 4.

4. If printer icon is normal but the printer is not printing, select the Printer menu and then select View Print Queue.
5. The print queue displays. If there are print jobs in the queue, the jobs are listed in the display.
6. If there are jobs in the print queue, cancel all the print jobs in the queue. For each line:
  - a. Select the line.
  - b. Click the Cancel button (the button is red with a white x).
  - c. When prompted, click Cancel Job.
7. Ask users to resubmit their print requests.

## 5.3. User Needs to Stop a Print Job

### *Symptom*

A user reports the printer is printing too much paper.

### ***Resolution Steps***

1. Turn off the printer.
2. Log in to main-server as the sysadmin.
3. Go to the printer window.
4. Click the icon of the printer that has the red symbol.
5. Select View Print Queue.
6. In the Print Queue window, select the first job displayed and cancel the job.
7. Check the queue to see if the job has been submitted multiple times.
8. If the same job was submitted multiple times, delete all instances of the job from the queue.
9. Turn on the printer.

## **6. MAINTENANCE TASKS: PERFORM WEEKLY**

### **6.1. Run systemCheck Command**

Run systemCheck weekly. This will identify disk partitions that are too full, hard disk health, backup status, and network problems.

#### ***Steps***

1. Log in as sysadmin.
2. Go to the System Management Dashboard and choose the button **System Check**.
3. Check the output for messages about problems.

## **7. MAINTENANCE TASKS: PERFORM MONTHLY**

### **7.1. Check Teachers Size**

Check the space used by each teacher account as well as checking how much space the teachers are using for trash and for media files, such as videos, music, and photos. This command should be run at least monthly.

#### ***Steps***

1. Log in as sysadmin.
2. Go to the System Management Dashboard and choose the button **Check Teachers Size**.
3. Enter the sysadmin password when prompted.
4. The size of the file space of each teacher account will be listed in descending order.
5. Shows the total size of each teacher's personal directory.
6. The app may run for a minute or more if there are many teacher accounts.

7. Trash size only includes the files in Trash; Trash size should always be very small.
8. “Media Size/Count” includes all videos and music in the teachers account
9. “Large Media Size/Count” includes all large video files
10. If the media size or count seem high, the teacher may be using the computer for personal storage

If a teacher is using a very large amount of disk space for their files, please confirm with them that these files are for educational purposes only. Personal files, and especially pirated files, should NEVER be stored on main-server. If they are personal files, the teacher or Super User should delete them.

## 7.2. Check Students Size

Check the space used by each student account as well as checking how much space the students are using for trash. This should be run at least monthly.

### *Steps*

1. Log in as sysadmin.
2. Go to the Super User Dashboard and choose the button **Check Student Size**.
3. Enter the sysadmin password when prompted.
4. The size of the file space of the student will be listed in descending order.
5. Shows the number and size of all videos, photos, and music files over a certain size, and any .exe/.iso files in the student’s folder; these files probably mean that the student is using the computer for personal files
6. The “Guest User” account may have a lot of personal and copied music and movie files

If you see many files in the Personal File Size/Count list, please use the **Cleanup Student Files** app to remove inappropriate files. If a student is using a very large amount of disk space for their files, please confirm that these files are for educational purposes only. Personal files, and especially pirated files, should NEVER be stored on main-server.

## 7.3. Check Disks

Checks the usage and status of both disks in the main-server.

### *Steps*

1. Log in as sysadmin.
2. Go to the System Management Dashboard and choose the button **Check Disks**.
3. Enter the sysadmin password when prompted.

This app shows the free space on all disk partitions, plus the status and key information about each disk drive

If the free space is getting low, please run the Cleanup Filesystems app. If the free space is still low, contact the Reneal Team for assistance.

## **8. MAINTENANCE TASKS: PERFORM AS NEEDED**

### **8.1. Start main-server**

Use this procedure when you need to start main-server, for example: at the beginning of the day.

#### ***Before You Start***

1. If the voltage stabilizer and UPS are not on, turn them on.
2. Confirm that the internet modem is on.
3. If the network switch is not on, turn it on.

#### ***Steps***

1. Power on main-server.
2. Log in as sysadmin.
3. Confirm that the server desktop appears as expected.
4. If there is internet, confirm that you can access the internet. Use the internet browser to go to google.com.  
  
If the google.com home page does not display, follow the appropriate troubleshooting procedure.
5. Log out.
6. Start up the client computers as required. Follow the procedure “Start a Client Computer” for all clients.

### **8.2. Shut Down main-server**

Use this procedure when you need to shut down main-server, for example: at the end of the day, before a move, etc.

#### ***Before You Start***

1. Turn off all client computers. Follow the procedure “Shut Down a Client Computer” for all clients.
2. Turn off the network switch.

#### ***Steps***

1. Select the “Shut Down” option in the upper right-hand corner of the main-server window. This will shut down the computer. However if a process is still active, you may need to do the following:
  - a. Log in to main-server as the sysadmin.
  - b. Select “Log Out” from the Applications Menu and then “Shut Down” from the window that appears. You will then need to enter the sysadmin password.
2. Turn off the UPS and voltage stabilizer.

### 8.3. Start a Client Computer

Use this procedure whenever you need to start a client computer, for example: after adding or moving a client, at the start of the day, etc.

#### ***Before You Start***

1. Confirm that main-server is on. If main-server is not on, follow the procedure “Start main-server.”

#### ***Steps***

1. Power on the client.
2. Confirm the client starts correctly.
  - a. Log in with your personal account.
  - b. Confirm that the desktop looks correct.
  - c. Start a program.

Program starts correctly.
  - d. Close the program.
  - e. Use the internet browser to access google.com.

The google.com page displays.
  - f. Close the browser window.
  - g. Log off.

#### **8.3.1. Shut Down a Client Computer**

Use this procedure whenever you need to shut down a client computer, for example: before moving a client, at the end of the day, etc.

#### ***Steps***

1. If a user account is still active, log out of the user account.
2. Left-click on “Preferences” in the lower left-hand corner of the screen, and select “Shutdown”.
3. Turn off power to the client.

#### **8.3.2. Add a Client Computer**

You can add a client computer at any time.

#### ***Before You Start***

1. It is recommended that you run a memory test on the client first before you add it to the system. To do this, boot the client computer from a System Rescue CD or USB drive. Choose Option A, Run system tools from floppy disk image, then choose Memtest86. You can remove the CD or USB drive once the memory test starts. You will want to run at least one pass to see if there are any memory errors. If there are errors, you should repair or replace the memory.



2. Confirm that the client computer is shut down.
3. Confirm that main-server is on. If main-server is not on, follow the procedure “Start Main-Server.”
4. Confirm that the network switch is on.

### ***Steps***

1. Set up the client computer where you want it.
2. Connect the network cable from the client to the network switch.
3. Plug the client into power. Plug in the mouse, keyboard, and monitor cables.
4. You will need to set the Client computer’s BIOS so it will boot from the network first.
  - a. The BIOS setup utility is where you change boot order settings. Turn on or restart your computer and watch for a message during the POST about a particular key, usually F1, F2, F10, or Del, that you'll need to press to enter SETUP. Press this key as soon as you see the message. After pressing the correct keyboard command from the previous step, you will enter the BIOS Setup Utility.
  - b. All BIOS utilities are a little different but no matter how your BIOS setup utility appears, they are all basically a set of menus containing many different settings for your computer's hardware. Locate the option for changing the boot order. The menu option or configuration item might be called Boot Options, Boot, Boot Order, etc. The boot order option may even be located within a general menu option like Advanced Options, Advanced BIOS Features, or Other Options.
  - c. To change which device to boot from first, follow the directions on the BIOS setup utility screen to change the boot order. Make the network (might be called LAN, PXE, Network, BBS, or another name) first. Then save your settings. You might also have to enable the network/LAN and also enable the LAN ROM. Those options are sometimes found other menu options called peripherals. [For a good description of changing boot order, see <http://pcsupport.about.com/od/fixtheproblem/ss/bootorderchange.htm> or Google for the type of computer you are working with.]
  - d. If the network boot (it might also be called PXE, BBS, MBA or LAN) is not shown as an option, you may need to enable it in the BIOS. This is somethings located in “Integrated Devices” or “Peripheral Devices”. It may be called “Enable LAN ROM” or “On with PXE”. Once you enable it, you can save the BIOS and then re-enter BIOS to repeat step c.
5. Follow the procedure “Start a Client Computer.”
6. Run the **School Information** app on the System Management Dashboard, described in Section 10.1, to update the number of clients in the computer lab.

### **8.3.3. Move One or More Client Computers**

You can move a client computer at any time.

### ***Before You Start***

1. Confirm that main-server is on.
2. Follow the procedure “Shut Down a Client Computer.”

### ***Steps***

1. Move the client computer to the new location.
2. Connect the network cable from the client to the switch.
3. Plug the client into power.
4. Follow the procedure “Start a Client Computer.”

#### **8.3.4. Discard a Client Computer**

If a client computer is broken beyond repair, follow this procedure.

### ***Before You Start***

1. Follow the procedure “Shut Down a Client Computer.”

### ***Steps***

1. Disconnect the client cables and store them.
2. Identify if there are parts that should be saved for repairing other client computers, such as memory, hard disks, or CD/DVD drives.

#### **8.4. Rebuild All Student Home Directories**

Normal rebuild is performed each time a student logs out. The main-server removes the student home directory for the student that just logged out then rebuilds a new copy. For example, when student1 logs out, the directory /client\_home\_local/student1 is removed and rebuilt. All changes that student1 may have made to the desktop, the trash, etc. are removed. This does not remove files that the student has saved in their Documents and Project directories.

You can also rebuild all student directories at the same time manually if one or more student directories are not working properly.

### ***Before You Start***

1. Make sure all student accounts are logged out.
2. Log into the system as the sysadmin.
3. Open the terminal window if it isn't already open.

### ***Steps***

1. At the terminal window prompt, type: **sudo rebuildStudentHomeDirectories** and press Enter.
2. If the system prompts for the sysadmin password, type the password and press Enter.

All existing student Home directories are removed and then new Home directories for each student account are created.

3. Confirm that the operation completed successfully:
  - a. Log out of the sysadmin account.
  - b. Log in as one of the students.

If you cannot log in, rebuild the student home directories again.

- c. Confirm the Applications menu shows the correct options for the students.
- d. Log out of the student account.

## **8.5. Network Switch**

### **8.5.1. Add a Network Switch**

This might need to be done if you add more client computers and no longer have any ports available in your existing network switch. Use only a “gigabit” network switch. Older “10/100” network switches will make the clients appear much slower for certain tasks.

#### ***Before You Start***

1. Make sure the new network switch is off.
2. Make sure the existing network switch has an empty port.
3. Make sure you have Ethernet cable to use to connect the new network switch to the existing network switch.

#### ***Steps***

1. Put the new network switch where you need it.
2. Connect the new network switch to the existing network switch.
  - a. Connect the Ethernet cable to a port on the new network switch. It is best to connect it to the highest numbered port so that each other port can be associated with consecutively numbered computers.
  - b. Connect the other end of the Ethernet cable to an empty port in the existing network switch. Please note that only one cable should be connected between the network switches.
3. Turn on the new network switch.
4. Connect devices to the new network switch.
5. Confirm the new network switch is working correctly. This can be done by inspecting the lights on the network switch and also checking to make sure the client computers connected to the new network switch are working.

### **8.5.2. Replace a Network Switch**

This might need to be done if a network switch fails. Use only a “gigabit” network switch. Older “10/100” network switches will make the clients appear much slower for certain tasks.

#### ***Before You Start***

1. Turn off the devices that are connected to the network switch you want to replace.

#### ***Steps***

1. Disconnect any devices connected to the network switch you want to replace.

2. Turn off the network switch you want to replace.
3. Remove the network switch you want to replace.
4. Install the new network switch.
5. Connect the new network switch to all the devices disconnected from the old network switch.
6. Power on the new network switch.
7. Turn on the devices connected to the network switch.
8. Confirm that the connections are active.

If main-server and the internet modem are connected to the network switch:

- a. Log on to main-server using your personal account.
- b. Confirm that the desktop appears as expected.
- c. Use the internet browser to access google.com.  
The google.com page displays.
- d. Close the browser window.
- e. Log off.

If client computers are connected to the network switch:

- a. Log on to a client computer using your personal account.
- b. Confirm that the client desktop appears as expected.
- c. Use the internet browser to access google.com.  
The google.com page displays.
- d. Close the browser window.
- e. Log off.

### **8.5.3. Remove a Network Switch**

#### ***Before You Start***

1. Turn off the devices that are connected to the network switch you want to replace.
2. Turn off the network switch you want to remove.

#### ***Steps***

1. Disconnect any devices connected to the network switch and connect them to the other network switch.
2. Confirm that the devices are connected to the other network switch and working properly.

If main-server and the internet modem are connected to the network switch:

- f. Log on to main-server using your personal account.
- g. Confirm that the desktop appears as expected.
- h. Use the internet browser to access google.com.  
The google.com page displays.
- i. Close the browser window.
- j. Log off.

If client computers are connected to the network switch:

- f. Log on to a client computer using your personal account.
- g. Confirm that the client desktop appears as expected.
- h. Use the internet browser to access google.com.  
The google.com page displays.
- i. Close the browser window.
- j. Log off.

- 3. Turn off the network switch you want to remove.
- 4. Remove the network switch.

## **8.6. Change the Internet Modem**

Follow this procedure if you need to change the internet modem.

### ***Before You Start***

- 1. Read the user's manual for the internet modem to review the installation procedures of the modem.

### ***Steps***

- 1. Turn off the existing internet modem.
- 2. Disconnect all cable from the existing internet modem.
- 3. Remove the existing internet modem.
- 4. Install the new internet modem as directed by the modem user's manual.
- 5. Turn on the new internet modem.
- 6. Connect the internet cable from the main-server to the internet modem. Connect the cable to the Ethernet port on the modem listed as "local network," "home network," or something similar. If the modem has several ports available, you can use any port that is in the row of closely spaced ports
- 7. Log on to main-server as sysadmin.

8. Run systemCheck to confirm that all of the hardware and software needed to connect to the internet are working correctly, as well as if the internet modem itself is working properly. Follow systemCheck's directions if you have problems.
9. Log in with your personal account on a client computer.
10. Confirm that you can access the internet.
  - a. Open an internet browser window.
  - b. Go to google.com.
  - c. Confirm that the google.com home page displays.
  - d. Close the browser window.
11. Log out of your account.

Please note that the Internet modem should always be connected directly to the server's motherboard LAN connection. The Internet modem should never be connected directly to the network switch.

Note that for the internet modem to work, you may need to set the internet address.

### ***Steps***

1. Contact the Reneal Team before you do this command. To set the internet modem address, go to the System Management Dashboard and choose the button **Set Internet Address**.

This command allows you to manually set the IP address for the internet interface to connect to the internet router. Normally this is done by the Reneal Team, and is only changed when a new internet modem is installed – you must consult the Reneal Team for this step.

You can check internet status by going to the System Management Dashboard and choosing the button **View Internet Status**.

This app shows the status of the server's connection to the internet. This app is useful only if you have internet and have a cable from the server to the internet modem. If you do not have internet it will always report that the connection is bad.

## **8.7. Replace a Network Card**

Follow this procedure when a network card on the main-server has failed. This is not a common procedure – it has not happened yet. Be sure to contact the Reneal Team before you do this. Make sure you have done careful troubleshooting to isolate the problem to the network card. Consider that anytime you open the computer case you might accidentally cause damage. The server will need some configuration changes after the card is installed, so contact the Reneal Team for further instructions. If internet is available Neal can do this remotely after the card is installed.

### ***Before You Start***

1. Shut down the main-server.
2. Unplug all cables from the main-server.

### ***Steps***

1. Open the case of the main-server.
2. Remove the defective network card.
3. Replace the defective network card with a new network card (must be a gigabit card).
4. Close the case of the main-server.
5. Plug in all cables.
6. The server will need to be configured to use the new card.
7. Test to ensure the new network card is working.

## **8.8. Fixing an Obstructed Fan in the Computer**

A cable may shift inside the case if the computer has been moved or, most likely, if the case has been opened and closed without proper care. If a cable lightly touches a fan it may cause a rattling noise. If it fully blocks the fan then the fan cannot turn. If the fan on the CPU heat sink is blocked then the computer should not start. If the computer turns on and then immediately turns off this may be the problem. This problem can occur with any computer but is most common with computers that have a fan on the side of the case.

### ***Before You Start***

1. Shut down the computer.
2. Unplug all cables from the computer.

### ***Steps***

1. Open the case of the computer.
2. Carefully examine the position of all cables. You may move the cable when you opened the case. The cable may not be blocking the fan but could still be close enough so that it does not block the fan at that moment but will when the computer is closed.
3. Move all cables away from fans. If the computer has a fan on the case side that you have removed you should experiment with opening and closing to confirm that there will not be a problem when the case is closed.
4. Close the computer case.
5. Plug in all cables but leave the computer in a position that all sides are clearly accessible.
6. Turn on the computer. It should start normally with all fans running. You can see the fans on the computer case turn and feel the air.
7. Turn off the computer, move to the normal operations position, and restart.

## **8.9. Internet Filtering**

There is something called “SquidGuard” which provides internet filtering to the system through the main-server. SquidGuard blocks bad sites so students cannot access them. SquidGuard is updated automatically through the internet, but computer teachers can also block additional sites that they choose.

### 8.9.1. Block a Web Site

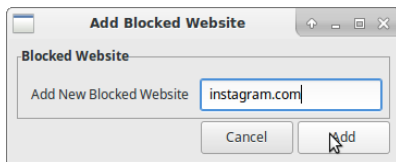
Follow this procedure when you need to block a website from users.

#### *Before You Start*

1. Log in as sysadmin.

#### *Steps*

1. To open the user interface to add a new blocked website, go to the System Management Dashboard and choose the button **Block Websites**.
2. Enter the sysadmin password.
3. Then it will open a window where you can add a new website that you wish to be blocked. The entry should be in the form of the top-level URL, for example, **facebook.com**. All sites that have the name as the main part of the domain name will be blocked. For example, the entry youtube.com will also block www.youtube.com, my.youtube.com, etc. After you have entered the website name, click OK. Below is an example.



4. Test that the new domain is blocked.

### 8.9.2. Unblock a Web Site

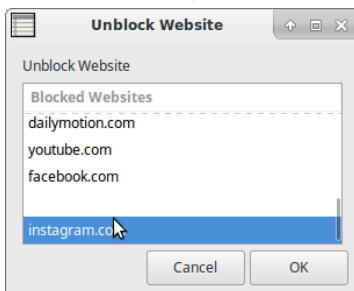
Follow this procedure when you want to unblock a website that was previously in the “blocked website” list.

#### *Before You Start*

1. Log in as sysadmin.

#### *Steps*

1. To unblock a website that is currently blocked, go to the System Management Dashboard and choose the button **Unblock Websites**.
2. Enter the sysadmin password.
3. Then it will open a window showing the list of currently blocked websites. Click on the website that you wish to unblock, and then click OK. Please just select one at a time. Below is an example.



4. Test that the domain is unblocked.



### 8.9.3. Turning the Internet On or Off

Follow this procedure when you want to turn the internet on or off. This might be useful if you have pay-on-use internet or you don't want the students surfing while you are teaching.

#### *Before You Start*

1. Log in as sysadmin.

#### *Steps*

1. To turn the Internet on or off, go to the System Management Dashboard and choose the button **Internet On/Off**.
2. Enter the sysadmin password.
3. You will be asked if you want to either turn the Internet on or off, depending on whether it is on or off right now. You also have the option of choosing a limited amount of time, if you want the internet to come on again after a class. Otherwise it will remember until you power down, or until you run **Internet On/Off** again.

### 8.10. Adding Additional Top-Level Folders to AllUsersShared and TeachersShared

It is highly recommended that you do not store a large number of files or folders at the top level of either AllUsersShared or TeachersShared. If you do, it becomes very hard to find any files that you have previously stored in those folders. It is better to use sub-folders to organize your work so files are easier to find. However, from time to time you may discover that you need to add a new folder at the top level of AllUsersShared, TeachersShared, or both. One example might be if a new subject were introduced in the curriculum. Then in both AllUsersShared and TeachersShared, you might want to add a new folder to hold files relating to that new subject.

Below are procedures for doing this. There is one procedure for AllUsersShared and one procedure for TeachersShared. The difference is just the permissions that are being set.

#### Adding Additional Top-Level Folder to AllUsersShared

- Log in as sysadmin
- Type the command `sudo mkdir /client_home/AllUsersShared/newfolder` where *newfolder* is the name of the folder you wish to add (for example, Kiswahili).
- Type in the sysadmin password.
- The new folder will be created. Now you will need to set the permissions and ownership properly.
- Type the command `sudo chmod 775 /client_home/AllUsersShared/newfolder` where *newfolder* is the name of the folder you added.
- Type the command `sudo chown -R root:teacher /client_home/AllUsersShared/newfolder` where *newfolder* is the name of the folder you added.

## Adding Additional Top-Level Folder to TeachersShared

- Log in as sysadmin
- Type the command `sudo mkdir /client_home/TeachersShared/newfolder` where *newfolder* is the name of the folder you wish to add (for example, Kiswahili).
- Type in the sysadmin password.
- The new folder will be created. Now you will need to set the permissions and ownership properly.
- Type the command `sudo chmod 770 /client_home/TeachersShared/newfolder` where *newfolder* is the name of the folder you added.
- Type the command `sudo chown -R root:teacher /client_home/TeachersShared/newfolder` where *newfolder* is the name of the folder you added.

## 8.11. Configuring Wireless Internet for the Server

If a school's internet source is through a wireless network rather than through an internet modem, a TP-Link ### USB wireless device can be attached to the server. Below is the procedure for doing this.

### ***Before You Start***

1. Log in as sysadmin.

### ***Steps***

1. Attach the TP-Link TL-WN725N Nano USB Adapter wireless device to the server. It is recommended that you insert it in one of the USB ports on the back of the server, so it cannot be seen by students or teachers.
2. To set up the wireless for the server, go to System and choose the program Setup Wireless.
3. Enter the sysadmin password.
4. The program will open a window showing the wireless networks that are available. Click on the one that the server should use. An example is shown below.



5. Then you will need to enter the password for the wireless network you have selected. Type in the password and click "Save".

If you have entered the correct password for the wireless network, the internet will now be available for the server and the client computers. If the wireless network name or password are changed, you will need to redo this procedure.

## 8.12. Cleanup Filesystems

The Cleanup Filesystems app is used when the amount of disk space in the OS ("/") partition is getting low. This can happen if some system files got were not properly deleted or a flash drive was not used correctly. It can also happen if the sysadmin account is used for storing personal files. Remember: Super Users should always use their personal teacher account for their work, not the sysadmin account. The sysadmin account is only for doing Super User commands and functions.

### *Before You Start*

1. Log in as sysadmin.
2. Have all users sign off before running this command.

### *Steps*

1. To clean up the file system in the OS partition, go to the System Management Dashboard and choose the button **Cleanup Filesystems**.
2. Enter the sysadmin password.

This removes unneeded or improper files in the OS partition. This does not remove any user files. This app may run for a minute or more.

If the "/" directory is still very full after running this app, please contact the Reneal Team.

## 9. TROUBLESHOOTING ISSUES

IMPORTANT: The program systemCheck will identify and possibly fix many problems. ALWAYS TRY TO RUN THIS PROGRAM FIRST BEFORE PROCEEDING. If the main-server is running and you can log in as sysadmin, then choose the Applications button, then systemCheck. (You can also still type **sudo systemCheck** in a terminal window and enter the sysadmin password when prompted.) See Appendix A, systemCheck Program for further details.

Not every possible problem can be discussed in this manual. Troubleshooting is a discovery process that gets easier as you learn more. Use Google to assist, and please contact Reneal Team Tanzania for assistance if needed.

### 9.1. Main-server Issues

#### 9.1.1. Main-Server Does Not Boot

##### *Symptom*

Main-server does not boot.

##### *Resolution Steps*

Confirm that the main-server has power and the UPS is turned on.

Check for messages displayed on main-server.

If	Then
You see the GNU menu.	Press the “Enter” key to begin boot.
Text appears but there is no menu.	Follow the procedure “Reboot main-server from the System Rescue CD.”
There is no text and the main-server lights are on.	There is a problem with the computer hardware. You should contact Neal or Reneal Team Tanzania before proceeding. Note: You should NEVER take the main-server to a computer shop or technician for repair. They are only used to Windows and will destroy the disks.
There is no text and the main-server lights are off.	Check the computer power cable and UPS on the main-server to make sure they are okay. If those are okay, there is a problem with the computer hardware. You should contact Neal or Reneal Team Tanzania before proceeding. Note: You should NEVER take the main-server to a computer shop or technician for repair.

### 9.1.2. Main-server doesn’t boot with the Message “Checking filesystems”

#### **Symptom**

You see something like the following on the screen:

```
Checking filesystems
Linux contains a file system with errors, check forced
Linux:
Inodes that were part of a computed option linked list found
```

```
LINUX: UNEXPECTED INCONSISTENCY; RUN fsck MANUALLY (i.e., without -a or -p option) [FAILED]
```

```
An error occurred during the file system check
Dropping you to a shell; the system will reboot when you leave the shell
```

Give root password for maintenance (or type CTRL-D to continue):

The Linux system files somehow became corrupted. It is very difficult to determine why the files became corrupted. It is possible that while the computer was shutting down files were not properly saved. This most commonly happens when the computer is shutdown with the power switch or a sudden power interruption.

#### **Resolution Steps**

1. Turn off the main-server immediately. You will need to press the power switch for several seconds.
2. Reboot the main-server and choose “Main Server Disk 2 (sdb2)” from the list of OS copies.
3. Log in as sysadmin.
4. Check the normal OS on disk1. Run the command **sudo fsck -f -r /dev/sda2**
5. As the system checks the file system, it may display questions.
6. For each question, type **y** and press Enter.

Each step takes some time to finish. Be patient and let each step finish.

If	Then
You have to type y for the first step more than 10 times.	<p>The disk is probably bad.</p> <ol style="list-style-type: none"> <li>Reboot main-server.</li> <li>At the GNU menu, select Main Server, Disk 2.</li> <li>Start this procedure again starting at Step 1.</li> </ol> <p>If the problem continues, both disks are bad or there is another hardware problem. You should contact Neal or Reneal Team Tanzania before proceeding.</p>

- Check the client\_home disk partition on disk 1. Type the command **sudo fsck -f -a /dev/sda7**
- Check the client\_home\_student disk partition on disk one. Type the command **sudo fsck -f -a /dev/sda6**
- Check that disk 1 is OK by running the systemCheck program. The status of each disk displays.
- Check the status of the disks. You will see a message if Disk 1 is bad.

If	Then
Main-server started from Disk 1 and Disk 1 is good.	You are done.
Main-server started from Disk 1 and Disk 1 is bad but Disk 2 is good.	<ol style="list-style-type: none"> <li>Reboot main-server.</li> <li>At the GNU menu, select Main Server, Disk 2.</li> </ol>
Main-server started from Disk 2 and Disk 1 is bad.	<ol style="list-style-type: none"> <li>Disconnect Disk 1.</li> <li>Replace Disk 1. You should contact Neal or Reneal Team Tanzania before proceeding.</li> </ol>
Both Disk 1 and Disk 2 are bad.	You should contact Neal or Reneal Team Tanzania before proceeding.

### 9.1.3. Reboot main-server Using the System Rescue CD

Use this procedure only when the computer cannot boot from any of the other choices in the GNU menu.

#### *Before You Start*

- Get the System Rescue CD.

#### *Steps*

- Put the System Rescue CD in main-server.
- Reboot main-server. A menu displays on a blue background.
- At the menu, select the first option "SystemRescueCd: default boot options".

If	Then
main-server reboots successfully.	The main-server hardware is still operational but both disks may be damaged. You should contact Neal or Reneal Team Tanzania before proceeding.
main-server does not reboot.	There appears to be some problem with the main-server hardware. You should contact Neal or Reneal Team Tanzania before proceeding.

### 9.1.4. Performance is Slow

#### *Symptom*

Computers are slow and few users are logged in.

### ***Resolution Steps***

1. If this occurs within 15 minutes of the first start of the main-server for the day the main-server may be performing disk backup. Wait 5 minutes and check again.
2. Confirm that this is happening for all client computers. Continue with these steps only if all computers are slow. If only a few are slow, restart those client computers.
3. Make sure there are no users editing video or creating animations (that can slow down the system). Certain other programs, such as the PhET simulations, may also cause slow performance if many students are using them. If users are not doing these things, log in to main-server as sysadmin.
4. Run the systemCheck program. This may tell you about a process that is running improperly and using too much computer processing.

If	Then
systemCheck shows a process that is using too much processing	<ol style="list-style-type: none"><li>a. Identify the <i>process-id</i> number from the systemCheck message.</li><li>b. Stop the process. Type the command <b>sudo kill -9 process-id</b></li><li>c. Run systemCheck again and repeat these steps if another process is shown</li><li>d. After no processes are listed check system performance.</li></ol>
No message from systemCheck	<ol style="list-style-type: none"><li>a. Ask all users to log out of the system.</li><li>b. Reboot main-server.</li><li>c. Log in to main-server as sysadmin.</li><li>d. Look at the System Activity Monitor to check CPU processing rates. If CPU processing rates are low, inform users that they can start using the systems again.</li><li>e. Log out of main-server.</li></ol>

### **9.1.5. Main-Server Intermittent Failures**

#### ***Symptom***

Main-server is not stable. The server has intermittent problems or errors.

There may be a memory problem.

#### ***Resolution Steps***

**Note:** Perform this procedure at the end of the day when users have finished this work. One of the steps launches a test that will run overnight. Users will not be able to use the system while the test runs.

1. Reboot the main-server.
2. Use the down arrow to select “Memory test (memtest86+) then press Enter
3. Memory Test Memtest86+ starts. This test takes several hours to complete. Let the test run overnight. Return to the school early the next day to complete the procedure.
4. When you return, check the test results on the main-server monitor.
5. When the test pass number is 2 or greater, check for errors.

<b>If</b>	<b>Then</b>
There are no errors.	The main-server is not experiencing memory errors. a. Reboot main-server. b. Start the client computers. c. Notify users that they can use the system.
Error messages display.	The main-server memory is faulty. f. Write down the first 4 lines of error messages. g. Inform users that the main-server needs to be fixed. h. Repair or replace main-server memory. You should contact Neal or Reneal Team Tanzania before proceeding.

### 9.1.6. Starting from a Backup Copy

You should consult with Neal or Reneal Team Tanzania first when it appears that there is a problem with the hard disks on the main-server. You should also run the systemCheck program to give you information about the disks.

When the main-server first starts up, there is a menu called the GNU menu. This menu helps you choose the hard disk partition to use for the operating system. There are four options to choose from:

- Main Server 16.04 (sda2) [default choice]
- Main Server Disk 2 (sdb2) [use if disk1 has problem]
- Main Server Backup (sda3) [use if there is a problem with operating system on the default partition]
- Main Server Disk 2 Backup (sdb3) [use if the sdb2 is not working]

If you KNOW that Disk 1 has failed or systemCheck gives you the emergency message about disk failure here is how you start up from Disk 2.

- If you are able to see the GNU menu when you turn on the main-server, then choose Main Server Disk 2 (sdb2)
- If the GNU menu does not appear, you will need to try with disk 2. First try to get the Boot Device Order window in the main-server BIOS. The first disk will have the letters WERA in the name, the second should have the letters ERMA (the disks are different models). If the Gnu Menu first line is Main Server Disk 2 (sdb2) you have started from the correct disk. Hit enter to continue the boot.
- Confirm that the main-server runs correctly. Let it run for several hours with normal use.
- If it runs correctly, make changes to the server to assure that it will always use Disk 2. First try changing the boot order for the disks in the BIOS menu. If this does not work and the server still tries to start from from Disk 1 you will need to open the computer and disconnect the cables from Disk 1. Disk 1 is the top disk in the computer case.

Please note though that when you start up from Disk 2, any work that was done since the last backup will be lost. Contact Reneal Team Tanzania immediately if you have a hard disk failure, and they can help you determine the best actions to take.

## 9.2. Log In Problems

### 9.2.1. No One Can Log In to Their Accounts

#### *Symptom*

All teachers cannot log in to their accounts but students can. This may mean that /client\_home has been completely filled with files (this may be common) or damaged somehow. This procedure will determine if /client\_home just needs to be remounted, or if it needs to be replaced with the backup copy.

#### *Resolution Steps*

1. Log in to main-server as sysadmin.
2. Run the systemCheck program. This may fix the problem or give more information and instructions
3. If systemCheck reports that the client\_home partition is full, run the app Check Teachers Size using the System Management Dashboard to try to find the problem and then work with those teachers to remove unneeded files or empty trash. You can check the size of other parts of client\_home with the command **sudo du -sh /client\_home/xx** where xx is the teacher's folder you wish to check.
4. Run the command **ls /client\_home**. You should see a list of the directories AllUsersShared, TeachersShared, teachers, etc. If you do not see a list, type the command **sudo mount /client\_home**. Repeat the **ls /client\_home** to see if the list of directories is there. If it is, continue with Step 4. If it is not, go to Step 5.
5. Try to log in as another teacher from another computer. If you are not successful, go to Step 5.
6. Shut down the main-server. Wait briefly then start the main-server again.
7. As soon as the GNU menu appears, use the down arrow on the keyboard to highlight the line Main Server Backup (sda3) and press Enter. This will try using the backup operating system to see if that fixes the problem.
8. When main-server is up, log in to your personal account (not as sysadmin).

If	Then
You cannot log in using Main Server Backup (sda3)	Go to Step 9.
You can log in.	Go to Step 12.

9. Shut down the main-server. Wait briefly then start the main-server again.
10. As soon as the GNU menu appears, use the down arrow on the keyboard to highlight the line Main Server Disk 2 (sdb2) and press Enter. This will try using the backup of /client\_home to see if that fixes the problem.

If	Then
You cannot log in using Main Server Disk 2 (sdb2)	Go to Step 11.
You can log in.	Go to Step 15. You will need to choose Main Server Disk 2 (sdb2) from the GNU menu.

11. If you still cannot log in to your personal account, follow the procedure "Reboot main-server Using the System Rescue CD."



12. Log out of your personal account.
13. Log in to main-server as sysadmin.
14. At the terminal window prompt, type **sudo grub-install /dev/sda** and press Enter.

System displays grub installed successfully. This will change the GNU menu to boot from sda3. Reboot to check the GNU menu to make sure Main Server Backup (sda3) is highlighted and starts automatically

15. Contact Neal or Reneal Team Tanzania and inform them that there is a problem.

If	Then
You were able to reboot from Main-server Backup (sda3).	Contact Neal or Reneal Team Tanzania and inform them that sda2 appears to be damaged.
You had to reboot from Main-server Disk 2 (sdb2).	Contact Neal or Reneal Team Tanzania and inform them that Disk 1 appears to be damaged. <ol style="list-style-type: none"> <li>a. You will need to choose Main Server Disk 2 (sdb2) from the GNU menu until you disconnect Disk 1 or disable Disk 1 in BIOS.</li> <li>b. Notify users that all work performed since the last daily backup (yesterday) has been lost.</li> </ol>

### 9.2.2. Sysadmin Cannot Log In

#### *Symptom*

Sysadmin tries to log in and cannot.

#### *Resolution Steps*

1. Log in to main-server as the very special “root” user. At the login prompt, type ‘root’ and enter the special root password.

**WARNING:** Any incorrect actions you perform as root can damage the system. Perform only the commands listed here and be sure to enter them correctly.

2. In a terminal window, type **passwd sysadmin** and press Enter.
3. Enter the sysadmin password at the prompt and press Enter.
4. Enter the sysadmin password again when prompted.
5. Log out as root.
6. Log in as sysadmin using the sysadmin password.

### 9.3. A Power Interruption Occurred

#### *Symptom*

There was a power surge or other power interruption and devices are off.

#### *Resolution Steps*

1. Turn on the devices one at a time in order shown below.

**Note:** After turning on a device wait one minute before turning on the next device.

**Caution:** As you power on devices, if you see sparks or see or smell burning, immediately turn off and disconnect the device. Do not use the device again. Discard the device and its power cord as soon as you finish this procedure. If the main-server is the problem then it may be repaired. You should contact Neal or Reneal Team Tanzania before proceeding.

- a. The voltage stabilizer and UPS for the main-server.
  - b. The monitor for main-server.
  - c. Main-server
  - d. All network switches
  - e. Internet modem
  - f. Client computers, one at a time. Wait until main-server is fully started.
2. After all devices are powered on, log in to main-server as sysadmin.
  3. Perform a complete test of the lab to check for problems by running the systemCheck program.
  4. Log out of the main-server.
  5. Make sure all the client computers started successfully.
  6. If there are any problems, follow the appropriate troubleshooting procedure.

## 9.4. Client Computer Issues

If a client computer does not start, please try troubleshooting it with the information below. However if you are still not able to get it to work, please contact Reneal Team Tanzania so they can work to repair or replace it.

### 9.4.1. A Client Computer Does Not Start: No Lights on the Computer or Monitor

#### *Symptom*

You try to start a client computer and it does not start. There are no lights on the computer or monitor. Other computers have power and start.

#### *Resolution Steps*

1. Make sure the computer is connected to power. Unplug the power cord and plug it back in again.

If the problem persists and	Then
The computer is a laptop.	Go to Step 2.
The computer is not a laptop.	Go to Step 3.

2. If the computer is a laptop:
  - a. Try a different power supply. Unplug the existing power supply and plug in a new power supply. If the laptop turns on, the first power supply is bad. Discard the bad power supply.
  - b. If the laptop does not turn on, go to Step 4.
3. If the client is not a laptop:
  - a. Check the lights on the CPU box. If the lights are not on, change the power cord. If there are still no lights on the CPU box, go to Step 4.

- b. If the CPU box lights are on, check the lights on the monitor.

If	Then
The monitor lights are on.	Make sure the monitor cable is connected to the computer.
The monitor lights are not on.	a. Make sure the monitor power switch is on. b. If the monitor lights are still off, replace the monitor. c. If the monitor still does not turn on, replace the monitor cable.

4. Check the power strip to which the computer power cord is plugged and make sure the power strip is on and receiving power.

If	Then
The power strip is on.	a. Plug the computer power cord into a different plug on the power strip. b. If the computer still does not turn on: i. Find a simple electrical device that you know works. ii. Plug the device into the power cord and turn the device on. If the device turns on, there is a problem with the computer. If the device does not turn on, replace the power strip.
The power strip does not turn on.	Replace the power strip.

#### 9.4.2. A Client Computer Does Not Start: Lights on the Client but No Messages

##### *Symptom*

You try to start a client and it does not start. There are lights on the client but no messages display on the screen. Other clients have power and start successfully.

The network cable may not be correctly connected to the client.

##### *Resolution Steps*

1. Unplug the network cable from the client.
2. Plug the cable back into the client.
3. Restart the client.

If	Then
The client starts successfully.	The problem is resolved.
The Check cable connection message appears.	Follow the procedure "A Client Computer Does Not Start: Check cable connection Message."

### 9.4.3. A Client Computer Does Not Start: Media Test Failure message

#### **Symptom**

When starting a client system, the startup sequence does not complete and the following message is displayed on the screen: Media test failure. This message only displays briefly, so you must watch the startup sequence carefully to see it. This problem can also sometimes result in a system booting to Windows, if it is a dual boot system.

#### **Resolution Steps**

1. Check the other client systems.

If	Then
Other client systems do not start and display the same message.	Confirm that the network switch has power.
All other client systems start successfully	Go to Step 2.

2. Check the network cable to the client computer.

- a. Unplug the network cable from the client.
- b. Plug the cable back into the client.
- c. Restart the client.

If	Then
The client starts successfully.	The problem is resolved.
The Media test failure message appears.	Go to Step 3.

3. Determine whether the network cable works with a different client.

- a. Unplug the network cable from the system that displays the message (the “problem client”).
- b. Shut down a client system that is working and whose network cable is connected to the same switch as the problem client.
- c. Unplug the network cable from the client system you just shut down (the “working client”).
- d. Take the network cable from the problem client and plug it into the working client.
- e. Restart the working client.

If	Then
The working client restarts.	The problem client is broken and needs to be repaired.
The working client does not start.	<ol style="list-style-type: none"> <li>Leave the working client on. Do not turn it off.</li> <li>Leave the problem client's network cable plugged into to the working client.</li> <li>Take the working clients' original network cable and plug the cable into the problem client.</li> <li>Restart the problem client. <ul style="list-style-type: none"> <li>If the problem client does not restart, the problem client is broken and needs to be repaired.</li> <li>If the problem client restarts successfully, there is a problem either with the cable or the switch. Go to Step 4.</li> </ul> </li> </ol>

4. Go to the switch and check the port light on the front of the switch. For example, if the network cable for the problem client is plugged into port 3, check the light for port 3.

If	Then
The port light for the problem client's network cable is on.	Go to Step 6.
The port light for the problem client's network cable is off.	Go to Step 5.

5. If the port light is not on, disconnect the cable from the port then reconnect the cable.

If	Then
The port light turns on.	<p>Return to the working client and restart it.</p> <ul style="list-style-type: none"> <li>If the working client restarts successfully: <ol style="list-style-type: none"> <li>Disconnect the network cable from the working client and connect it to the problem client.</li> <li>Restart the problem client. If the problem client restarts successfully the problem is resolved.</li> <li>Reconnect the working client's network cable to the working client and restart the working client.</li> </ol> </li> <li>If the working client does not restart successfully, go to Step 7.</li> </ul>
The port light does not turn on.	Go to Step 7.

6. Move the problem client's network cable to another port on the switch.

If	Then
There are unused ports on the switch.	Move the problem client's network cable to an open port.
There are no unused ports on the switch.	<ol style="list-style-type: none"> <li>Shutdown one of the working clients that is connected to the switch.</li> <li>At the switch, unplug the network cable of the client you just shut down.</li> <li>Plug the problem client's network cable in the open port.</li> </ol>

7. Check the light for the port where you just plugged in the cable.

If	Then
The port light does not turn on.	The cable may be broken. Go to Step 8.
The port light turns on.	<ol style="list-style-type: none"> <li>Go back to the working client and move the network cable back to the problem client.</li> <li>Restart the problem client. <ul style="list-style-type: none"> <li>If the problem client starts successfully, the network cable is good but the port it was originally plugged into is bad and should not be used.</li> <li>If the problem client does not start successfully, go to Step 8.</li> </ul> </li> </ol>

8. Replace the cable.

- Connect the new cable to the original port and the problem client.
- Restart the problem client.

If	Then
The problem client starts successfully.	<p>The problem is resolved.</p> <ol style="list-style-type: none"> <li>Reconnect any working clients and network cables that were disconnected.</li> <li>Restart the working clients.</li> </ol>
The problem client does not start successfully.	Try removing power completely from the client computer, then plugging it in again. Sometimes this will fix the problem, especially if it is a dual boot computer. If it does not, go to Step 9.

9. Use Google to research the computer model to see if there are any known problems with network boot for that computer. You can also try booting from a network boot CD or adding a LAN card to the computer to see if that fixes the problem.

#### **9.4.4. All Client Computers Do Not Start and Show the Message “No Ethernet Connection”**

##### ***Symptom***

None of the client computers start.

##### ***Resolution Steps***

- Log in as sysadmin and run the systemCheck program.
- Make sure the network switch is on.

If	Then
The network switch is on.	Remove power from the network switch. Wait one minute and then plug it back in to restart it. Go to Step 3.
The network switch is off.	Turn on the network switch. Go to Step 3.

- Confirm the client computers are connected to the switch and reboot them by turning them off and then back on.
- Run the systemCheck program for further information.

5. If the problem is still the same, then connect a client computer directly to main-server.
6. Disconnect a client's cable from the switch. Disconnect one of the two cables that are connected to the Ethernet cards on the main-server. Connect the end of the cable from the client to the main-server
7. Confirm that the light on the main computer's interface is on. Try to start the client.
8. If the client starts, contact Reneal Team Tanzania to troubleshoot or replace the network switch.

#### **9.4.5. A Client Computer Does Not Start: DHCP Message Displays for 30 seconds or more**

##### ***Symptom***

A client computer stops during start up and a DHCP message displays for 30 seconds or longer.

##### ***Resolution Steps***

1. Log in as sysadmin and run the systemCheck program. This could restart a needed process.
2. If a process was reported as restarted, try to start the client computer again.
3. Also try the steps outlined in Section 9.4.3.

#### **9.4.6. A Client Computer Fails to Boot (Dual Boot Computer)**

A client computer may fail to boot to the network properly if it has booted to Windows or the workstation version of Linux previously. The symptom of this is that the light on the back of the client showing network activity does not light up, or lights up but then goes out.

This problem can sometimes be fixed by removing power completely from the client computer for several seconds, and then plugging it back in. However the problem will probably reappear if it boots again to Windows or the workstation version of Linux. One way to avoid the problem is to change the BIOS to boot only from the network, never from the hard disk.

### **9.5. Teacher-Related Issues**

#### **9.5.1. Teacher Encounters Problems when Trying to Run a Program**

##### ***Symptom***

While trying to use a program, the teacher gets an error that is not printer or internet related. For printer and internet problems, see other troubleshooting procedures.

##### ***Resolution Steps***

1. Ask the teacher to log out of their account and to log back in again.
2. If the problem persists, ask the teacher to try to use the program on another client.

If	Then
The teacher does not encounter the same problem on the second client.	<ol style="list-style-type: none"> <li>Restart the first client.</li> <li>Ask the teacher to use the program on the first client.</li> <li>If the teacher encounters the same problem, ask the teacher to experiment with their program settings to try to solve the problem.</li> </ol>
The teacher encounters the same problem on the second client.	Go to Step 3.

- When the teacher can recreate the problem on a second client, ask the teacher to show you the problem.
- If this is a very common problem that many teachers see it may simply be a program bug. You can do nothing further. If the problem not common, continue with these procedures.
- Log in to the second client using your personal account.
- Try to recreate the problem. Note your results (you can or cannot recreate the problem).
- Log out of the second client.
- Go to the first client and log in using your personal account.
- Try to recreate the problem.

If	Then
You can recreate the problem on both clients.	<ol style="list-style-type: none"> <li>Log out of the client.</li> <li>Go to main-server and log on as sysadmin.</li> <li>Try to recreate the problem.</li> </ol> <p>If you can recreate the problem, follow the steps under "Sysadmin can recreate the problem on main-server" below.</p> <p>If you cannot recreate the problem, follow the steps under "Teacher can recreate the problem on two clients but sysadmin cannot" below.</p>
You can recreate the problem only on the first client.	There is a problem with the first client.
You cannot recreate the problem on either client.	Follow the steps under "Teacher can recreate the problem on two clients but sysadmin cannot" below.

Sysadmin can recreate the problem on main-server

- At the end of the day when all users have logged out but before daily backups are made, reboot main-server.
- As soon as the GNU menu appears, select Main Server Backup Disk 1 (sda3) and press Enter.  
System runs from the first backup copy on the backup server.
- Log in as sysadmin.
- Try to recreate the problem.



If	Then
You can recreate the problem.	Do nothing further; the problem requires Neal or Reneal Team Tanzania for further assistance. Write down your findings and contact them. Log out of the main-server and reboot normally.
You cannot recreate the problem. The program works successfully.	<ol style="list-style-type: none"> <li>Reboot main-server and select Main Server Backup Disk 2 (sdb2) in the GNU menu.</li> <li>Run the command <b>sudo revertOSFromCopy</b></li> <li>Inform Neal or Reneal Team Tanzania that you needed to run this command.</li> </ol>

Teacher can recreate the problem on two clients but sysadmin cannot

You can try to fix the problem by copying the teacher's home directory from the backup so that it is like the day before. You should only do this if this is the first day that the teacher has seen the problem. If they have seen in previous days then do not do this. If you will do the following procedure tell the teacher that they may lose their current day's work if they wish to keep the changes. Ask them to copy all of their current day's work onto a flash drive before continuing.

1. Make sure the teacher is logged out and remains logged out until you tell the teacher it is ok to log in again.
2. Log in to main-server as sysadmin
3. At the terminal window prompt, type **sudo mount /OS\_Copies/ClientHomeCopy** and press Enter.
4. Make a temporary copy of the user's home directory. All new teacher's directories are in `/client_home/teachers`. If your server was upgraded from 12.04, the preexisting teachers directories may still be in `/client_home`. At the prompt, type **sudo rsync -axH /client\_home/userHomeDirName /tmp**

Where *userHomeDirName* is the name of the user's home directory. (For example, *teachers/teacher1* or *teacher1*).

**Caution:** When entering the command, make sure there is a space but no slash at the end of *userHomeDirName*.

If user has many files, this may take up to 5 minutes.

5. Press Enter.
6. Reset the teacher's home directory to the system backup copy from the previous day. At the prompt, type:  
**sudo rsync -axH --delete /OS\_Copies/ClientHomeCopy/userHomeDirName /client\_home**
7. Press Enter.
8. Type **sudo umount /OS\_Copies/ClientHomeCopy** and press Enter.
9. Log out as sysadmin.
10. If the program still does not work for the teacher return reset the teachers home directory to the current day  
At the prompt, type:: **sudo rsync -axH --delete /tmp/userHomeDirName /client\_home**

11. If the program works then tell the teacher that he or she can use the fixed program but that they will lose all of their work done that day if they do not have a copy elsewhere. If they do not wish to do this, reset the teacher's directory as shown in Step 10.
12. Please contact Neal or Reneal Team Tanzania for further assistance. There may be a software problem that could be fixed by them.

### **9.5.2. A Teacher Cannot Log In to Their Account (Wrong or Forgotten Password)**

#### ***Symptom***

A teacher cannot log in to their account.

#### ***Resolution Steps***

1. Log in to main-server as the sysadmin.
2. Follow the procedure "Reset a Password for a Teacher Account."
3. After resetting the teacher's password, return to the terminal window.
4. At the prompt, type **su *accountName*** and press Enter. *accountName* is the teacher's account name.
5. At the Password prompt, enter the teacher's new password and press Enter.

The prompt changes and displays the teacher's account name.

6. At the prompt, type **cd** and press Enter.
7. At the prompt, type **ls** and press Enter.

The files in the teacher's home directory are listed. If you do not see a list of files, follow the steps for the procedure "User Cannot Access Home Directory".

8. Log out of the teacher's account. At the prompt, type **exit** and press Enter.
9. The sysadmin prompt displays.
10. Provide the teacher with the new password and confirm that the teacher can log in.

### **9.5.3. Teacher Does Not See Their Files in File Manager**

#### ***Symptom***

A teacher tried to access their files using File Manager or other application and they do not see their personal files.

#### ***Resolution Steps***

1. At main-server, ask the teacher to log in to their account.
2. Go to Applications and select File Manager.
3. In the File Manager window, select File System from the left navigation area.
4. Select Backup.
5. In the Backup window, select **client\_home**.

If	Then
The teacher's directory is displayed in the client_home window.	Go to Step 6.
The teacher's directory is not displayed in the client_home window.	Follow the procedure "Restore a Teacher's Directory from Backup."

6. Right-click the teacher's directory and select Properties.
7. Select the Permissions tab.
8. Look at the Ownership information. The value for User should be the teacher's account name and the value for Group should be "teacher". If the User and Group values are not set correctly, go to Step 9.
9. Log out of the teacher's account.
10. Log in as sysadmin.
11. In the terminal window, type:

```
sudo chown accountName:teacher -R /client_home/teacherDirectoryName
```

Where *teacherDirectoryName* is the name of the teacher's directory.

**Caution:** Be sure to use the correct directory name. If you make a mistake, you will damage the system or prevent other users from accessing their files.

12. Press Enter.
13. At the prompt, enter the sysadmin password.

## 9.6. Hanging Program

If a program hangs, the user can run the Task Manager to kill the process. Note that the Task Manager application uses a lot of CPU power, so be sure to choose "Quit" when you are finished.

### **Resolution Steps**

1. Choose Accessories, Task Manager
2. Find the process that is hanging. Right-click on it and select "Kill" or "Terminate". (LibreOffice sometimes hangs, so if it does, look for LibreOffice or soffice in the list of processes.)
3. Click "Quit"

## 9.7. Internet and Intranet Issues

### **9.7.1. "Connecting" Message Displays in a Browser Tab When Users Try to Access the Internet**

#### **Symptom**

Users can see the local web home page but cannot access the Internet and see the message "Connecting" in the browser tab.

### ***Resolution Steps***

Run the systemCheck program. This will either fix the problem or identify it.

<b>If</b>	<b>Then</b>
systemCheck reports a problem with the internet connection outside of the modem	Turn off the modem for one minute. Unplug and plug back in the cable from the ISP. Start the modem. If the modem light does not turn on after turning off the modem and turning it on again, ISP service is down. If the service is off longer than usual, report the problem to your ISP.
systemCheck reports a problem with the internet modem	Turn off the modem for one minute then start it again.  Run systemCheck again to see if the modem is working. If so, wait for the internet connection light on the modem and try to use the internet.  If systemCheck still reports a problem with the modem refer to the user's manual for the modem to attempt to connect to it and run self tests on it.  If this fails, repair or replace the modem.
systemCheck reports a problem with the connection to the internet modem	Unplug and replug the Ethernet cable between the modem and the main-server. Check the lights at both ends. If both are on, run systemCheck.  If both lights were not on, replace the Ethernet cable with one that you know is good. Again check both lights and run systemCheck. If the modem light is out, turn off and turn on the modem. If the light on the Ethernet on the main-server is out, then reboot the main-server.
systemCheck reports that it restarted one or more processes	Rerun systemCheck to confirm that the processes did not need to be restarted again. If systemCheck reports no errors try to use internet.  If it reports that it restarted the same processes again, reboot the main-server.  If the problem persists after reboot, reboot the main-server using the GNU menu choice "Main Server Backup (on sda3)" at start. Inform Neal or Reneal Team Tanzania that there may be a problem with sda2.

### **9.7.2. "The proxy server is refusing connections" Message Displays When Users Try to Access Internet**

#### ***Symptom***

Users can see the local web home page but cannot access the Internet and see the message "The proxy server is refusing connections."

#### ***Resolution Steps***

1. Run systemCheck. It should report that it restarted squid. If so then run systemCheck again to confirm that it did not need to be restarted again.
2. If systemCheck did not start squid again, force the process to be restarted. At the terminal window prompt, type **sudo systemctl restart squid** and press Enter.
3. If the system prompts for the sysadmin password, type the password and press Enter.

The system displays:

```
squid stop/waiting  
squid start/running, process number
```

4. Try to access the internet.
5. If users still cannot access the internet, reboot the main-server and check the internet.
6. After rebooting, run systemCheck again. If systemCheck is unable to restart squid or if squid dies immediately after restarting, then type **sudo /usr/local/bin/rebuildSquidCache** and press Enter. This will completely erase and rebuild the squid disk partition on both disks, and then it will restart squid. After this is finished, run systemCheck to confirm success. Then check the internet to see if it is now working.
7. If users still cannot access the internet, go to the troubleshooting procedure *“‘Connecting’ Message Displays in a Browser Tab When Users Try to Access the Internet”*.

### **9.7.3. “ERROR The requested URL could not be retrieved” Message Displays When Users Try to Access Internet**

#### ***Symptom***

Users can see the local web home page but cannot access the Internet and see the message “ERROR The requested URL could not be retrieved” in the browser tab.

#### ***Resolution Steps***

1. Get the full error message from the user.
2. First try to confirm that the internet is working properly. To do this, try google.com.
3. Log in as sysadmin and run the systemCheck program. This may report that a process needed to be restarted.
4. Run systemCheck again to confirm that the process was restarted.

### **9.7.4. Users Cannot View the Intranet Home Page or Access the Intranet**

#### ***Symptom***

Users try to access the intranet with Firefox and see the message “Unable to connect. Firefox can’t establish a connection to the server at main-server.lcl.”

#### ***Resolution Steps***

1. Run the systemCheck program. This should restart the intranet server process “apache”. Run systemCheck again to confirm that the process continues to run.
2. Try to access the intranet.

## **9.8. Troubleshooting Utilities**

### **9.8.1. Fix File Properties**

The Fix File Properties app is found on the System Management Dashboard. The Fix File Properties app might fix problems if some programs are not working or if the server stops during the bootup process.

#### ***Steps***

1. To fix the owners and permissions of each system file, go to the System Management Dashboard and choose the button **Fix File Properties**.
2. Wait until the app is completely finished before close the window.

This app checks the owner and permissions of each system file in the system. It will fix any owners and permissions that are wrong, and it will show which were changed.

The app may run for a minute or more

If the server will not boot, please boot from the backup (second line in the boot menu) and then run the Fix File Properties app.

### 9.8.2. View System Logs

The View System Logs app is found on the System Management Dashboard. If you experience a problem, Reneal Team Tanzania may ask you to run this app and send a picture of the results.

#### **Steps**

1. To display information in the system log files, go to the System Management Dashboard and choose the button **View System Logs**.
2. You can then select the log file to view.

This app shows information reported by programs about the server as they are running. The information is stored in files called 'log' files that this app reads and updates the window as soon as something is written.

The three logs that are most helpful for troubleshooting problems are:

- **systemCheck.log** This shows the results from the SystemCheck app that is run automatically once each hour.
- **syslog** This shows information from many different server programs reports.
- **mirror.log** This shows the results of the backup program that runs once each day. The last part of 'mirror.log' should be read when System Check reports a problem with server backups.

### 9.8.3. Rebuild LTSP Client

The Rebuild LTSP Client app is found on the System Management Dashboard. You can run this app when the client computers are showing a network connection but don't get to the blue Welcome screen.

1. To rebuild the LTSP client image file, go to the System Management Dashboard and choose the button **Rebuild LTSP Client**.
2. Wait until the app is completely finished before close the window.

This app rebuilds the LTSP client computer OS image files (for example, amd64.img).

This app will take about 2 minutes to run. Please wait until you see 'Finished' in the window before closing the window.

## 10. SYSTEM CONFIGURATION

### 10.1. School Information

Displays and allows for editing of information (school name and number of clients) about the school and lab.

#### *Steps*

1. To display or edit school information, go to the System Management Dashboard and choose the button **School Information**.

This is used when requested by the Reneal Team.

If the number of client computers is increased, this app should be run and the number of clients edited.

### 10.2. Computer Information

Displays information about your school's server hardware.

#### *Steps*

1. To display the server information, go to the System Management Dashboard and choose the button **Computer Information**.

This is used when requested by Reneal Team Tanzania. They may ask you to take a picture of the output and send it to them.

### 10.3. Interface Warning Off

This app sets which warnings will be reported on the status window of the server login page. This is used when you add or remove internet from your school, or if you have a failed network interface in your server.

#### *Steps*

1. To set the warnings to be reported, go to the System Management Dashboard and choose the button **Interface Warning Off**.

Set Internet Connected to 'No' if you are not connected to the internet.

Select 'Failed' for a Lab Interface if it is permanently failed (that might be a bad ethernet cable that you are unable to replace or some other problem that will not be quickly fixed).

Select 'Working' as soon as the connection on that interface is working again or if you wish to test the interface.

## APPENDIX A: SYSTEMCHECK

The computer program systemCheck has been created to automatically perform numerous tests to look for problems within the server and across the network. If a problem is detected that can be easily fixed, systemCheck will do so. Any problems that it finds are reported to the user along with suggestions for further problem identification and repair. To run the systemCheck program, go to the System Management Dashboard and choose the button **System Check**.

There is also a constant display of system status on the server log-in screen, Super Users don't have to sign in to the server to see systemCheck results. This display updates system status every 5 minutes, when systemCheck is run automatically.

Because systemCheck can aid so much in finding and resolving problems it should be used as the first step when there is almost any problem in the computer lab. systemCheck also performs numerous computer health checks on the main-server so you should run it regularly to be warned of future problems.

systemCheck performs these actions:

- Check disk free space for all partitions and warn if any partitions are too full.
- Check disk hardware health and warn of problems.
- Check that all required disk partitions are mounted (connected to the system so that they are active). If a partition is not mounted, check and fix it if possible. If check/fix is successful remount it and confirm success.
- Check time of last successful backup and warn if too old.
- Check that all critical service processes are running. Restart any that are not running and check again to assure that the process is active.
- Check processor use of all processes on the main-server and warn of those that appear to be using too much CPU.
- Check system load monitor logs and report if the system appears to be too heavily loaded over a long period.
- Check all network interfaces for correct connection and configuration.
- Check the internal network for active computers.
- Check that the internet modem is turned on and can talk to the main-server.
- Check that packets can be sent and received from the internet.
- Check that the computer can get internet network addresses from the URL name.
- Check that normal internet communications to a known site are possible.
- Check the quality of the internet connection.
- Checks the percent usage for some of the system partitions – if any are getting too full, systemCheck will report it and will also empty trash and remove unnecessary files, files saved in error, or inappropriate



media files.

systemCheck may run for a minute or more to perform all of these checks. As it runs it will report the start of each group of tests so that you can see its progress. After it has completed all tests it will report “Completed Tests” then “Starting test result analysis”.

If no problems have been found it will report “Completed test result analysis”, “No problems found”, and finally “System Check completed”. This means that everything is OK.

If some problems have been found by the tests, these will be reported after “Starting test result analysis”. Each problem will be reported in one of three ways in an individual block separated by a blank line.

1. “Will attempt to fix this problem” systemCheck has discovered a problem that it can fix. The description of the fix is followed by the system command that will be run. The command will then be performed. Some commands may take a longer time. When the command completes then the result of the attempted fix will be shown. Some fixes may take several steps. The action and result of each step is given in the block.
2. “Problem>” systemCheck has found a problem that It cannot fix. After a description of the problem systemCheck gives instructions for actions that you must perform to fix the problem.
3. “WARNING: Serious Problem>>” This is a problem that will require that you perform the action given as soon as possible to prevent or minimize system damage. At this time, only disk failure or very serious file system problems are reported with this message.

If systemCheck has identified further actions that you should perform, it will describe the required actions after the line “\*\*\*\*\*Do this next and then rerun systemCheck \*\*\*\*\*”. These may be further actions to be performed in addition to any actions described in the listing of a problem.

Finally, if some problems were discovered, systemCheck will give the summary line “-- x problems found. y problems fixed.”

It is very important that you follow the instructions that systemCheck gives you!

If any problems were discovered, rerun systemCheck after you have performed the recommended actions to confirm successful fixes.

systemCheck is an evolving program. Neal created it after the initial design of the System Administrators manual showed the need for an easy-to-use tool to automate the many tests and actions required for system problem solution and system health checks. As time permits further enhancements will be added to help a system administrator.

systemCheck – Use it early. Use it often.

## APPENDIX B: KEY DISK LOCATIONS

### **/client\_home**

This is a large disk partition that contains all of the teachers' accounts, the shared storage areas, and all of the contents of Rachel and Khan Academy.

Key Directories in /client\_home:

- **/EducationalMaterial** This contains the contents of Khan Academy and Rachel. The directory should not be changed in any way.
- **/TeachersShared** This contains files to be shared among teachers and is organized by subject areas. All teachers can read and write into the subject directories contained in this directory but students cannot read this directory or any contents.
- **/AllUsersShared** This is organized in the same way as TeachersShared. Teachers can read and write into the subject areas in this directory but students can only read. This can be used for materials that teachers wish to share with students such as readings and homework.
- **/Teachers** All teachers home directories. The directory for a teacher contains all information and settings for that teacher. All contents are private for that teacher. [Please note that legacy teacher accounts that were created in Ubuntu 12.04 may not be in the /client\_home/Teachers folder but may instead be in the /client\_home folder.]

### **/client\_home\_students**

This disk partition contains all of the files that the students have created or saved. Because this is a partition, no other part of the server will be affected if the students abuse their storage and completely fill the partition.

Key Directories in /client\_home\_students

- **/guestUser** – the directory where all files are stored when the student chooses “Guest” at sign-in.
- **All form levels** Each of these directories contains a directory for each stream. The individual student directories are named with the student’s name and are contained in the appropriate stream directory. Note: the directories are only created when the student signs in for the first time. This means that some stream directories and individual student directories will not be seen when viewing this area. This is normal and is not a problem.

### **/client\_home\_local**

This directory contains all of the numbered student home directories that are created with the rebuildStudentHomeDirectories command. These individual directories are deleted and recreated every time the student logs out. If there are any problems with some numbered student account on login you can just run the rebuild command after all students are logged out.

## **/etc**

This directory contains many files that control the configuration of the entire server. No files in this directory should be edited or deleted without specific instruction and guidance from Neal or Reneal Team Tanzania.

## **/home**

This directory contains the home directories for the sysadmin and master user. The master account is used only by the system creators. Local system administrators should use the sysadmin account only when necessary to perform administrative or maintenance actions.

## **/usr**

This directory contains most of the programs, system libraries, shared system files, etc. The directory `/usr/local` contains the custom files and programs created for the servers by Reneal. The directory `/usr/local/bin` contains the custom programs. The directory `/usr/local/etc/account_templates` contains the files that are used to create the student and teacher accounts.

## **/var**

Key areas of this directory are:

- `/var/log` This directory contains the systems log files. These are most easily read by the “Log File Viewer” in the “System” menu block. The syslog files in `/var/log` are used as the general place for most system log messages. The mirror files in `/var/log/mirror` contain information about the system backups.
- `/var/lib/tftpboot/ltsp/i386/ltts.conf` This file may need to be edited if older low memory (256 MB) computers are added to your lab. Please note though that 512 MB is really the minimum memory needed for clients to run in Ubuntu 16.04.

## **/OS\_Copies**

The directories under this directory are links to the other backup partitions. Normally they are not connected (mounted) so you will see nothing in them. If it is necessary to look in one of these backup directories (for example you need to look for or copy a damaged or erased file), you can use the command **sudo mount /OS\_Copies/xxx** where xxx is the backup partition that you need to read from.

## **/media**

This is where you will see external drives or USB flash drives after you have plugged them in. They will be in `/media/username` where *username* is the account name of the user logged into the computer at the time that the drive was inserted. When inserted, the USB flash drive files are located at `/media/username/flashdrivename`, where *flashdrivename* is the name of the user’s flash drive.

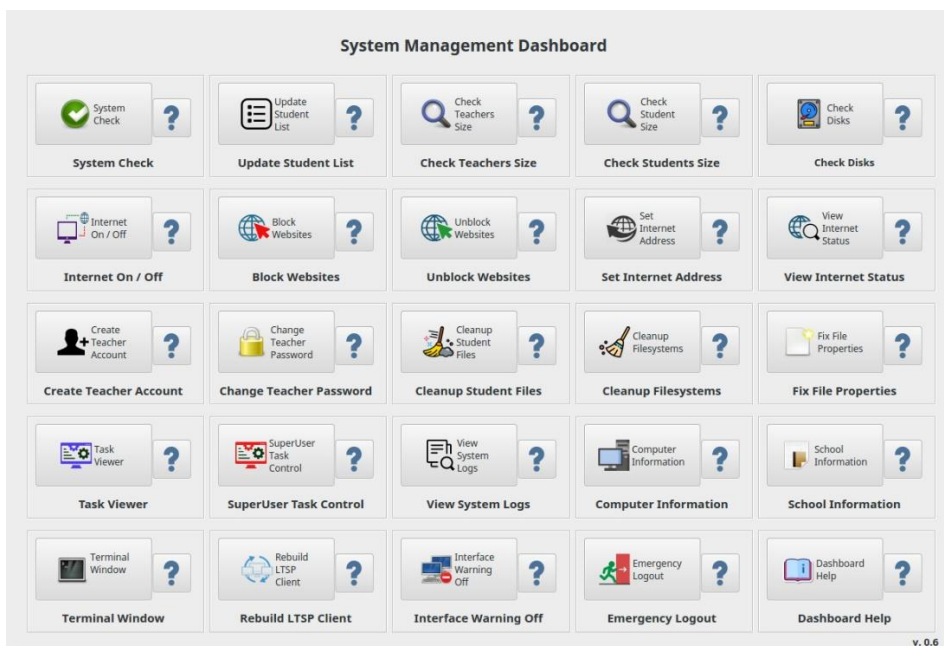
Note that sometimes people put files in `/media` or in `/media/username`. These are not correct places for file storage and will not result in files being stored on the USB flash drive.

## APPENDIX C: SYSTEM MANAGEMENT DASHBOARD

### Introduction

The Reneal system has many apps to help the school System Administer (Super User, or SU) perform their different tasks. The main responsibilities of the SU are to monitor the Reneal system health, manage teacher and student accounts, control internet usage, and troubleshoot and repair problems with the help of the Reneal Team.

The System Management Dashboard provides all of these apps in one place that is always available on the desktop when the SU signs into the sysadmin account. It replaces some commands that were found in the “System” menu and some commands that were executed on the Linux command line. These apps should be much easier for the SU to use now. Use just a single click with the left mouse button to start an app.

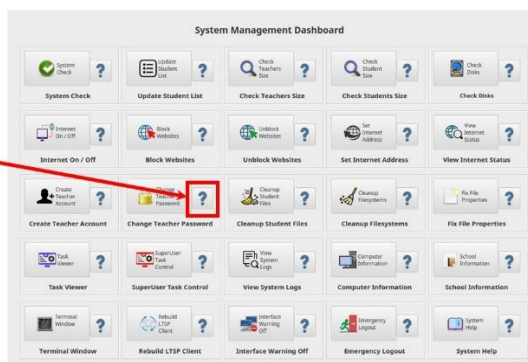


When the SU single-clicks one of the apps on the dashboard, they will get a small information window explaining what that app does. They can also click the “Help” button beside each app to get more information about the app, as well as watch a video that explains what the app does and how it is used.

### Super User Dashboard: Help

Clicking the question mark “?” will show what the button does

You will also see a short description of what the button does when you click it, and a link to a video about the button



In the following sections, the different apps supporting each SU task will be described.

## Regular Monitoring Tasks

The most important app that will help the SU is “System Check”. It checks many different functions and will fix many problems automatically. If it can’t fix a problem, it will tell the SU what to do. It is always important for the SU to do any actions suggested by System Check!

The latest version of the System Check app provides help with some common problems. One big issue is when the SU, teachers, or students fill up their space on the disk. System Check will now automatically delete inappropriate things, like large media files, that have been saved in teacher or student accounts.

However, it is also a good idea for the SU to regularly (at least monthly) see which teachers and students are using the most space, to make sure they are not using more than they should. The SU should run the Check Teacher Size and Check Student Size apps to make sure the use is appropriate. If some teacher or student is using a lot of disk space, the SU should check to make sure it is related to school use.

Check Disks shows the percent of each partition being used and the health of the disks.

### System Check

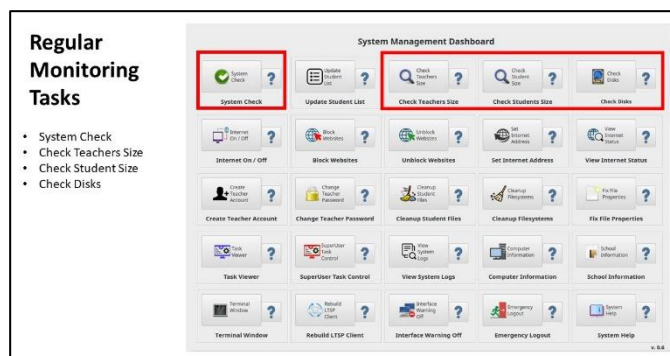
- *When to use:* weekly, or if there is a problem
- *What it does:*
  - ✓ System Check tests many different parts and processes
  - ✓ If it finds a problem it will fix it if it can and reports that the problem has been fixed
  - ✓ If System Check cannot fix the problem it, it will tell you what to do
  - ✓ If System Check tells you to do something to fix a problem, do that action immediately; the problem will not be fixed until you do what System Check says
- *Reference:* System Administration Manual version 7.0, Section 2.8 and Appendix A

### Check Teachers Size

- *When to use:* monthly
- *What it does:*
  - ✓ Get the size of each teacher’s personal directory
  - ✓ The app may run for a minute or more if there are many teacher accounts.
  - ✓ Total size includes everything in the teacher’s account
  - ✓ Trash size only includes the files in Trash; Trash size should be very small.
  - ✓ “Media Size/Count” includes all videos and music in the teachers account
  - ✓ “Large Media Size/Count” includes all large video files
  - ✓ If the media size or count seem high, the teacher may be using the computer for personal storage
- *Reference:* System Administration Manual version 7.0, Section 7.1

### Check Students Size

- *When to use:* monthly
- *What it does:*
  - ✓ Shows the disk space used by each student



- ✓ Shows the number and size of all videos, photos, and music files over a certain size, and any .exe/.iso files in the student's folder; these files probably mean that the student is using the computer for personal files
- ✓ The "Guest User" account may have a lot of personal and copied music and movie files
- If you see many files in the Personal File Size/Count list, please use the Cleanup Student Files app to remove inappropriate files
- *Reference:* System Administration Manual version 7.0, Section 7.2

## Check Disks

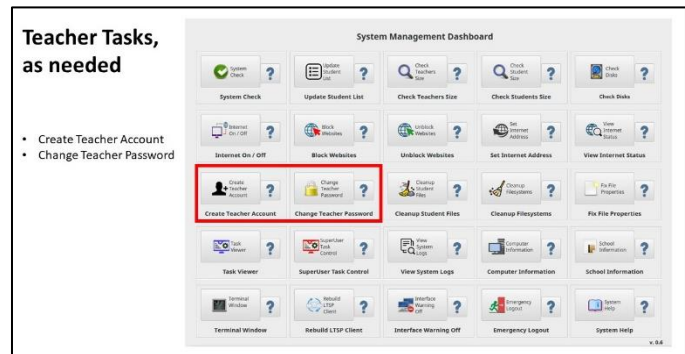
- *When to use:* monthly or when there is a problem
- *What it does:*
  - ✓ Shows the free space on all disk partitions
  - ✓ Shows status and key information about each disk drive
- If the free space is getting low, please run the Cleanup Filesystems app
- If the free space is still low, contact the Reneal Team for assistance
- *Reference:* System Administration Manual version 7.0, Section 7.3

## Teacher Tasks

The SU is responsible for creating new teacher accounts as they are needed. They are also able to change teacher account passwords when requested.

### Create Teacher Account

- *When to use:* to add a new teacher account to the system
- *What it does:*
  - ✓ This command creates a new teacher account
  - ✓ You must enter the teachers first name, last name, and birthdate
  - ✓ The new teacher's account name will be the first letter of the first name, a '\_' and the last name (all small letters)
  - ✓ The password will be 8 numbers, the birthdate of the teacher (ddmmyyyy)
- If you want to change the password after creating the account, use the Change Teacher Password app
- *Reference:* System Administration Manual version 7.0, Section 3.1



### Change Teacher Password

- *When to use:* to change the password on a teacher account
- *What it does:*
  - ✓ This command changes the password on a teacher account
  - ✓ You must enter the new password twice
  - ✓ The new password will be set immediately, so any logins to the account after you choose 'OK' in this app will need to use the new password
- *Reference:* System Administration Manual version 7.0, Section 3.2

## Student Tasks

At the beginning of the year, it is very important for the SU to create a new student list for the server. This allows students to sign in and have their own personal folder for file storage.

The SU must also monitor the student files, to make sure that only school-related items are being stored. This is especially important for schools that have internet.

### Update Student List

- *When to use:* beginning of the school year or to add new students
- *What it does:*
  - ✓ Updates the student list file that is used by the Student Sign-In window when students log in
  - ✓ This app opens a file choice dialog where you can choose one or more files of student information to add to the student\_list.csv file; these files must be in the correct format
  - ✓ When you have chosen the files the app will show the number of students added and the total number of students
- Read the System Administration Manual version 7.0, Section 4.2.2 before using this app for the first time, or watch the special video on creating student information files in the System Help app
- *Reference:* System Administration Manual version 7.0, Section 4.2

### Cleanup Student Files

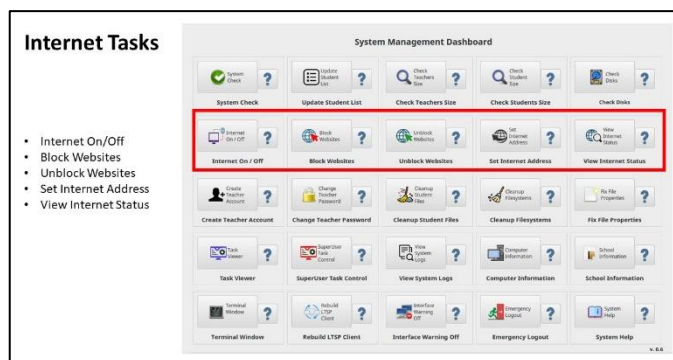
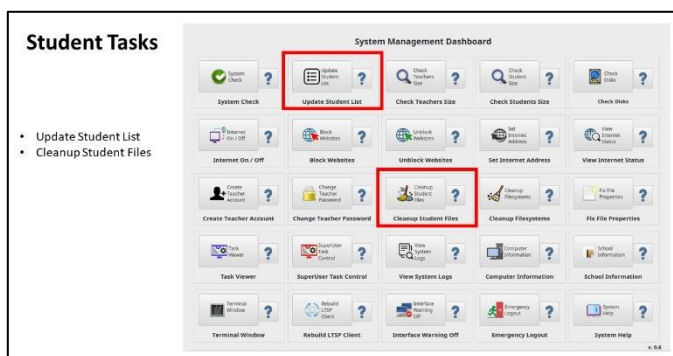
- *When to use:* after running the Check Student Size app, if some students seem to have a lot of personal files like movies, music, photos, etc. that may not be school-related
- *What it does:*
  - ✓ This only shows students that have files that may not be appropriate (videos, music, and photo files over a certain size and any .exe/.iso files)
  - ✓ The Super User should review the list of files shown for each student
  - ✓ For each student the Super User should tick the files that are appropriate and should be saved
  - ✓ Once you click OK, all UNTICKED FILES WILL BE DELETED
- Students that have stored inappropriate files should be reprimanded
- *Reference:* System Administration Manual version 7.0, Section 4.4

### **Internet Tasks**

If a school has internet, they may need to turn the internet on and off at times. There is also a capability to block or unblock websites. They can check internet performance, and they can also set an internet address if needed.

### Internet On/Off

- *When to use:* to temporarily turn off internet access in the lab
- *What it does:*
  - ✓ If your school has internet, it turn internet browser access on or off
  - ✓ This can be used to temporarily shutdown the internet while teaching classes, etc.
  - ✓ It does not shutdown the internet connection or internet hardware - it just stops computers in the lab from using the internet when turned off
  - ✓ This acts instantly and can be used as often as you wish without harming the true internet hardware connection or critical internal server internet actions





- ✓ If the internet is off, clicking this command will turn the internet back on
- *Reference:* System Administration Manual version 7.0, Section 8.9.3

### Block Websites

- *When to use:* when you want to block a website from being accessed
- *What it does:*
  - ✓ Adds a new internet website to be blocked, so the website cannot be accessed in the computer lab
  - ✓ The new entry should be typed in the form like this: **youtube.com**
- *Reference:* System Administration Manual version 7.0, Section 8.9.1

### Unblock Websites

- *When to use:* when you want to unblock a website to allow access
- *What it does:*
  - ✓ Removes the blocking from an internet website, so the website can be accessed in the computer lab
  - ✓ Remember to block the website again after you have finished, if you do not want continued access
- *Reference:* System Administration Manual version 7.0, Section 8.9.2

### Set Internet Address

- *When to use:* contact Reneal Team to do this if a new internet modem is installed
- *What it does:*
  - ✓ Manually set the IP address for the internet interface to connect to the internet router
  - ✓ Normally this is done by the Reneal Team, and is only changed when a new internet modem is installed – please consult the Reneal Team
- *Reference:* System Administration Manual version 7.0, Section 8.6

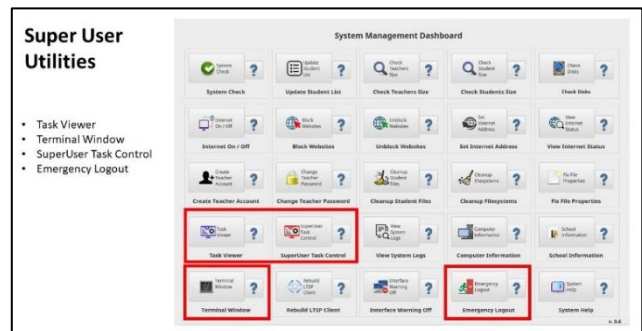
### View Internet Status

- *When to use:* if the internet is not working properly
- *What it does:*
  - ✓ Show the status of the server's connection to the internet
  - ✓ This app is useful only if you have internet and have a cable from the server to the internet modem
  - ✓ If you do not have internet it will always report that the connection is bad
- *Reference:* System Administration Manual version 7.0, Section 8.6

## SU Utilities

The Dashboard includes some utilities that might be used by the SU, such as the Task Manager to either view processes or kill processes.

The SU also sometimes needs a terminal window to type commands.





## Task Viewer

- *When to use:* to view all sysadmin programs currently running on the server
- *What it does:*
  - ✓ This app shows all sysadmin programs running on the server, sorted by the amount of CPU time the program is using
  - ✓ You can click on the 'RSS' column header to sort by memory use
- You cannot stop a program with the Task Viewer app
- If you need to stop a program that is using too much CPU or memory, use the SuperUser Task Control app
- *Reference:* System Administration Manual version 7.0, Section 9.6

## SuperUser Task Control

- *When to use:* to view all programs running on the server – can also stop programs
- *What it does:*
  - ✓ This app shows all programs running on the server, sorted by the amount of CPU time the program is using
  - ✓ You can click on the 'RSS' column header to sort by memory use or on the 'UID' column header to sort by user
  - ✓ To stop a program that is using too much CPU (70%+) or memory (2GB) that makes the server slow, use the mouse button right click on the program entry line and choose 'Terminate' – if this does not stop a bad program it might be completely stuck running so then use 'Kill'
- **WARNINGS:**
  - ✓ If you Terminate or Kill a program owned by a user, that user might lose all work they are doing in that program. Ask the user to log out before you terminate their program.
  - ✓ If you Terminate or Kill a program that is owned by Root you might cause problems that will require the system to be rebooted.
  - ✓ If you Kill a program that is owned by Root, you might cause bad server problems that cannot be fixed with a reboot.
- *Reference:* System Administration Manual version 7.0, Section 9.6

## Terminal Window

- *When to use:* when you need to use the command line to type a command
- *What it does:*
  - ✓ Open a terminal window so that you can type in computer commands
- *Reference:* System Administration Manual version 7.0, Section 2.3.1

## Emergency Logout

- *When to use:* only use if you cannot log out normally
- *What it does:*
  - ✓ This app should be used only if you cannot log out normally – it will automatically log out the sysadmin account
  - ✓ Any unsaved work will be lost
  - ✓ It will not affect any server system processes
- *Reference:* System Administration Manual version 7.0, Section 2.2.2

## Troubleshooting and Repair Tasks

There are several apps that can be used to help troubleshoot and repair problems.

The main app is still System Check. It will find and fix many kinds of problems automatically. Always be sure to do whatever actions that System Check tells you to do.

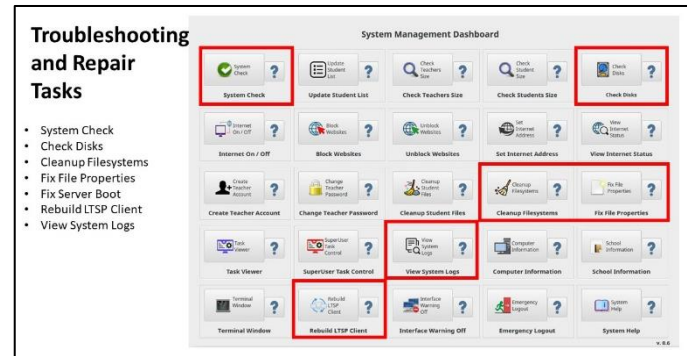
Check Disks shows the percent of each partition being used and the health of the disks.

Cleanup Filesystems is an app that will clean up some unneeded or unwanted files within the OS partition.

Fix File Properties is an app that fixes a bug that would sometimes set incorrect ownership and/or permissions in system files. This bug could result in the system not booting or certain programs, like student login, to not work properly.

View System Logs makes it easy to look at system log files while troubleshooting a problem.

Rebuild LTSP Client is an app that fixes a bug that would sometimes accidentally delete the client .img image file. This bug could result in clients not being able to boot.



### System Check

- *When to use:* weekly, or if there is a problem
- *What it does:*
  - ✓ System Check tests many different parts and processes
  - ✓ If it finds a problem it will fix it if it can and reports that the problem has been fixed
  - ✓ If System Check cannot fix the problem it, it will tell you what to do
  - ✓ If System Check tells you to do something to fix a problem, do that action immediately; the problem will not be fixed until you do what System Check says
- *Reference:* System Administration Manual version 7.0, Section 2.8 and Appendix A

### Check Disks

- *When to use:* monthly or when there is a problem
- *What it does:*
  - ✓ Shows the free space on all disk partitions
  - ✓ Shows status and key information about each disk drive
- If the free space is getting low, please run the Cleanup Filesystems app
- If the free space is still low, contact the Reneal Team for assistance
- *Reference:* System Administration Manual version 7.0, Section 7.3

### Cleanup Filesystems

- *When to use:* during troubleshooting, or if the amount of disk space in the OS partition is getting low
- *What it does:*
  - ✓ Please have all users sign off before running this command
  - ✓ This removes unneeded or improper files in the OS partition

- ✓ This does not remove any user files
- ✓ This may run for a minute or more
- *Reference:* System Administration Manual version 7.0, Section 8.12

### Fix File Properties

- *When to use:* during troubleshooting
- *What it does:*
  - ✓ This app might fix problems with some programs working or if the server stops during the bootup process
  - ✓ Checks the owner and permissions of each system file in the system
  - ✓ It will fix any that owners and permissions that are wrong and show which were changed
  - ✓ The app may run for a minute or more
- If the server will not boot, please boot from the backup (second line in the boot menu) and then run the Fix File Properties app
- *Reference:* System Administration Manual version 7.0, Section 9.8.1

### View System Logs

- *When to use:* during troubleshooting, or if requested by the Reneal Team
- *What it does:*
  - ✓ This shows information reported by programs about the server as they are running
  - ✓ The information is stored in files called 'log' files that this app reads and updates the window as soon as something is written
- The three logs that are most interesting are:
  - ✓ systemCheck.log This shows the results from the SystemCheck app that is run automatically once each hour.
  - ✓ syslog This shows information from many different server programs reports.
  - ✓ mirror.log This shows the results of the backup program that runs once each day. The last part of 'mirror.log' should be read when System Check reports a problem with server backups.
- *Reference:* System Administration Manual version 7.0, Section 9.8.2

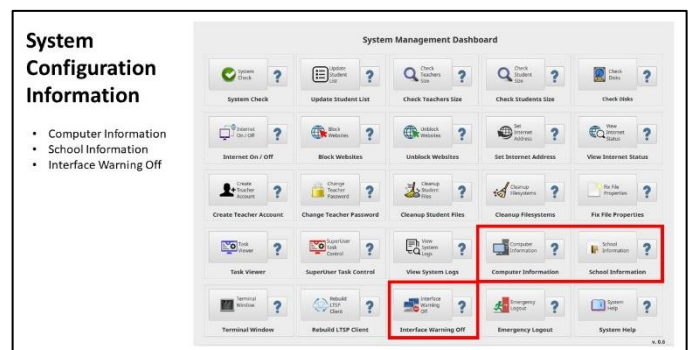
### Rebuild LTSP Client

- *When to use:* clients show a network connection but don't get to the blue Welcome screen
- *What it does:*
  - ✓ Rebuilds the LTSP client computer OS image files
  - ✓ This will take about 2 minutes – wait until you see '.. Finished ..' in the window before closing
- *Reference:* System Administration Manual version 7.0, Section 9.8.3

## System Configuration Information

The server now has a file that contains the school name and the number of clients at that school. This information can be edited by the SU or by the Reneal Team. The number of clients is important, because it will determine how many student accounts are automatically created.

There is also a configuration setting that allows the SU to



turn off warnings if there is no internet or if one of the interface cards is not working properly.

### School Information

- *When to use:* when requested by the Reneal Team
- *What it does:*
  - ✓ Displays and allows for editing of information (school name and number of clients) about the school and lab
- If the number of client computers is increased, this app should be run and the number of clients edited
- *Reference:* System Administration Manual version 7.0, Section 10.1

### Computer Information

- *When to use:* when requested by the Reneal Team
- *What it does:*
  - ✓ Shows information about your school's server hardware
- *Reference:* System Administration Manual version 7.0, Section 10.2

### Interface Warning Off

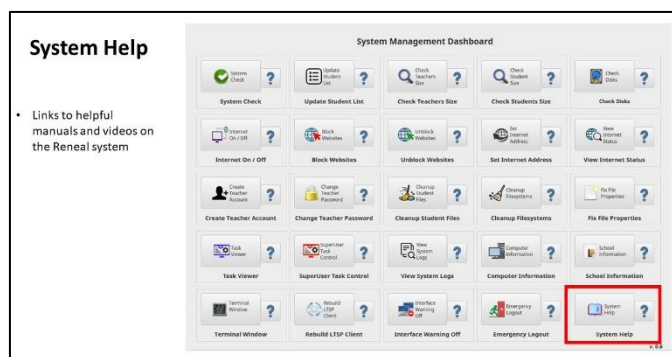
- *When to use:* if you add or remove internet from your school; if you have a failed lab interface
- *What it does:*
  - ✓ Set which warnings will be reported on the status window of the server login page
  - ✓ Set Internet Connected to 'No' if you if you are not connected to the internet.
  - ✓ Select 'Failed' for a Lab Interface if it is permanently failed (that might be a bad ethernet cable that you are unable to replace or some other problem that will not be quickly fixed)
  - ✓ Select 'Working' as soon as the connection on that interface is working again or if you wish to test the interface
- *Reference:* System Administration Manual version 7.0, Section 10.3

## System Help

This app will provide resources (manuals and videos) with information about the Reneal system and how to use and maintain it.

### System Help

- *When to use:* any time you have questions about the system
- *What it does:*
  - ✓ System Help provides a list of documents and videos that help explain how the Reneal system works



## APPENDIX D: REVISION LOG

Version 7.0      Released January 2023

- Updated with capabilities and changes introduced in the 2022 Tanzania Server Software Update
- References to Philippines-specific issues have been removed, as well as Section 3.4 which was exclusively for the Philippines
- Updated Section 2.3 to add the System Management Dashboard
- Updated Section 2.4 with the new approach for system backups
- Updated Section 2.7 with the new partition naming convention – also updated all partition references in the manual to match the new partition naming convention
- Updated Section 2.8 and Appendix B with new capabilities of systemCheck
- Updated Sections 3.1, 3.2, 4.2, 7.1, 8.6, 8.9.1, 8.9.2, 8.9.3, 9.6 for the System Management Dashboard
- Added Section 2.9, System Management Dashboard
- Added Section 4.4 Cleanup Student Files
- Added Section 7.2, Check Students Size
- Added Section 7.3, Check Disks
- Added Section 8.12 Cleanup Filesystems
- Added Section 9.8 Troubleshooting Utilities (Section 9.8.1 Fix File Properties, Section 9.8.2 View System Logs, Section 9.8.3 Rebuild LTSP Client)
- Added Section 10, System Configuration (Section 10.1 School Information, Section 10.2 Computer Information, Section 10.3 Interface Warning Off)
- Added Appendix C, a complete description of the System Management Dashboard
- Moved the revision log to Appendix D

Version 6.0      Released January 2020, specifically for schools with Ubuntu 16.04 systems

- Revised Section 3.1 now has two sections. Section 3.1.1 describes a new program for creating a teacher account that can be run from the program menu instead of the command line. Section 3.1.2 includes the description of the command line approach that can still be used if your server does not have the new program installed.
- Revised Section 3.2 now has two sections. Section 3.2.1 describes a new program for changing a teacher account password that can be run from the program menu instead of the command line. Section 3.2.2 includes the description of the command line approach that can still be used if your server does not have the new program installed.

- Section 4.2.2. has been updated to include an easier way for Tanzania Super Users to prepare the student name list for the updateStudentList program. This can be used when the students' full names are in a single column.
- Added Section 8.11, Configuring Wireless Internet for the Server

Version 5.0      Released March 2018, specifically for schools with Ubuntu 16.04 systems

- Manual has been updated for Ubuntu 16.04
- systemCheck can now be run from the program menu
- Updated manual in several places for Xubuntu 16.04
  - “.py” is no longer needed for executing Python programs
  - squid instead of squid3
- Updated manual in several places to include David Nyangaka as a source of help in Tanzania
- Deleted Section 2.5
- Added Section 3.6, Using the ManageClasses program
- Revised Sections 4.1 and 4.2 to add the updateStudentList capability, and moved them to Sections 4.2 and 4.3
- Revised Section 4.3 with endOfYearCleanup program, and moved it to Section 4.1 since it should be run first before creating the new Student Name List at the beginning of the school year
- Revised Section 7, checkUserHomeSize and checkUserTrashSize programs have been combined into a single program
- Revised Section 8.9.1. and 8.9.2 with new programs for blocking/unblocking web sites that can be run from the program menu instead of the command line
- Added Section 8.9.3 with a new program that can turn the Internet on or off
- Added Section 8.10 to add additional top-level folders to AllUsersShared and TeachersShared
- Revised Section 9.1.2 with new program checkFilesystems program

Version 4.0      Released January 2015

- In Section 9.7.2, added a step to run a new utility, rebuildSquidCache, if the internet cannot be reached (“proxy failed” message)
- Updated Appendix A with the new capabilities of the systemCheck program
- Updated manual in several places to include arushacomputerhelp@gmail.com as a source of help in Tanzania

Version 3.0      Released December 2014

- Added Section 3.5, which explains how to change the permission for a file
- In Section 4.1, added the student list format information for Tanzania schools

Version 2.0      Released September 2014

- In Section 3.9, added new way of typing an enye (Philippines only)
- In Section 4.1, added that there cannot be an enye used in the student list file
- In Section 8.9, made it clearer where there should be spaces in the commands that are typed for blocking and unblocking websites
- Updated Appendix A with the new capabilities of the systemCheck program
- Added Appendix B, information about the server directory structure

Version 1.0      Released March 2014