User Documentation manual
R.00

CS50 Final Project 2014
Marco Chrappan

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1. Introduction

Fixxer is a general purpose maintenance management system database built on MYSQL and PHP language. It has been designed for managing preventive maintenance on a collection of assets defined in a tag list (where the tag code itself indicate a custom code to identify an asset).
Its purpose is to define a set of activities to be periodically perfomed on the assets and to record the activities completion over a period of time, comprising remarks, hours spent, cost etc.

2. Tags

The taglist contains a set of tags defined by the user. A tag is a block of data representing a physical device or asset, the object of the maintenance activities.
A tag can be for example:

- A tank
- A motor device
- A computer terminal
- The HVAC system
- An electrical cabinet
- The alarm device for fire&gas system

The tag code is a unique name given to identify the element. Usually a company uses an internal code or an approved standard to code a tag. Also a location, area and plant information are given for the tag together with a description usually documenting its functionalities.

The heart of the tag definition is composed by two fields: equipment type and equipment sub-type. These two fields identify the family of assets for the tag itself.
Another significant information is the basedate from which the periodicity of the planned maintenance will be computed.

The tag physical counterpart is defined by serial code element information. For example a tag during its lifecycle can be represented by different serial numbers of the same model. For example the same motor device with a tag identification can be replaced by the same model after a breakage but different serial number. These data are collected in a linked table called serial.

The tag itself can only be added and edited. They cannot be deleted, but only put out of service.

3. Serials

The serials table contains the serial code information together with vendor, model and other info. A serial is usually assigned to a tag completing its definition. Serials can be added from a catalogue defined by the system administrator. Users can choose from a predefined list of choices and add a unique serial code together with vendor model etc.

4. Maintenance Masters

The maintenance master is the element of the system defining the planned activities and their frequencies for a family of assets/tags.

The master has a field, the equipment type which can be matched with an asset and its work instructions are defined each one with an equipment subtype.
The equipment type is the link then between the master and the tag.

This method prevents the user to write several masters for a family of assets on which the same maintenance procedure shall be applied. The relationship of the master to tag is then one to many. Moreover, the subtype is used to define variation of the same typical. For example a master has to applied to two motor devices which are identical apart from the fact one has a failure alarm. The master is the same except the second motor needs an additional work instruction. Instead of creating two masters, the user creates two subtypes and assign all the work instructions to both subtypes, except a check on the failure alarm that has to be assigned only to the second subtype.

For this revision of the software the following detail have to be applied:

- If a work instruction is valid for more than one equipment subtype, the operator has to enter the same work instruction for each equipment subtype needed into the maintenance master form.
- A max of 20 work instruction is foreseen in the maintenance master form

5. Service Calls

A service call is an event required by the system. Service calls are generated by the system following the planned maintenance for a tag. The user selects a time interval to be considered and every event planned for that interval is generated and recorded in the database.
When the maintenance personnel has ended the planned maintenance, details has to be added for closing the service calls (work hours, remarks, date of completion)

6. User administration

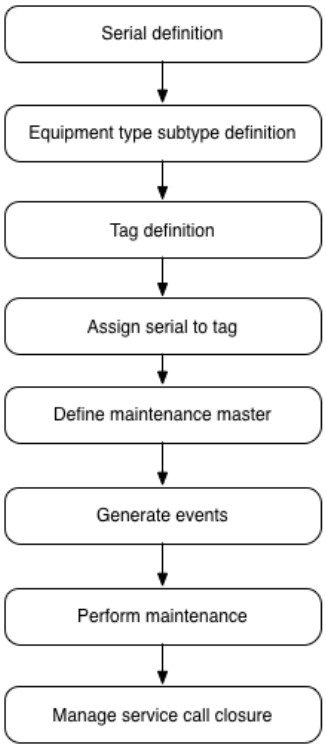
The manage users link lists each existing user on the system together with two actions for each of them (edit and delete).

An additional link called ‘Add new admin’ will set out a new user for the system.

There are no groups in this revision, each user is an administrator.

7. Work flow

The following flowchart represent the main workflow for a single tag:



a. Serial code switch

The physical situation of a item breakage (for example a computer terminal being replaced by an identical model) is represented in the system with a serial code switch. To perform this operation the user has to find the desired tag, click on the tagname hyperlink to access the edit tag form. Once on the edit tag form at the bottom of the upper section there's a hyperlink called serial code switch.
Clicking on this link opens the serial switch form, in which the user can select a new serial with a select form. Only the free serial numbers are showed. Selecting the new serial and pressing the confirm button completes the operation.

b. Equipment type/subtype switch

Equipment types are created with the bottom menu link "New Equipment Type". Once created subtypes can be added by editing an equipment type on the upper menu link "Equipment Types" and following the add new subtype hyperlink.

The equipment type/subtype switch for a tag is then performed in the following way:

- If the type has to be changed just select a new type with the drop down select menu (which will list all the existing types)
- The selection will open a new window in which on another dropdown select menu the new subtype can be chosen.

- If only the subtype has to be changed just click on the link contained under equipment subtype row in the tag edit page and repeat the second step.

c. Deactive / Activate Master

A new master is created with the flag active turned to 0 (off). This prevents the master to be operative and events to be generated upon itself. To activate the master click activate master and select the master by using the dropdown select menu. For deactivation follow the deactivate link and proceed in similar way.

d. Revise Master

To revise a master, the master itself can be edited like the tag from the taglist. In this revision once created a master has been linked to an equipment type. The work instructions can still be added and edited (comprising the eq subtype).

To create a new revision it is suggested to create a new version with identical checks or work instructions and fill the revision field accordingly. Then modify the copies master as desired, activate it and deactivate old revision. In this way the history of revision is kept into the system.

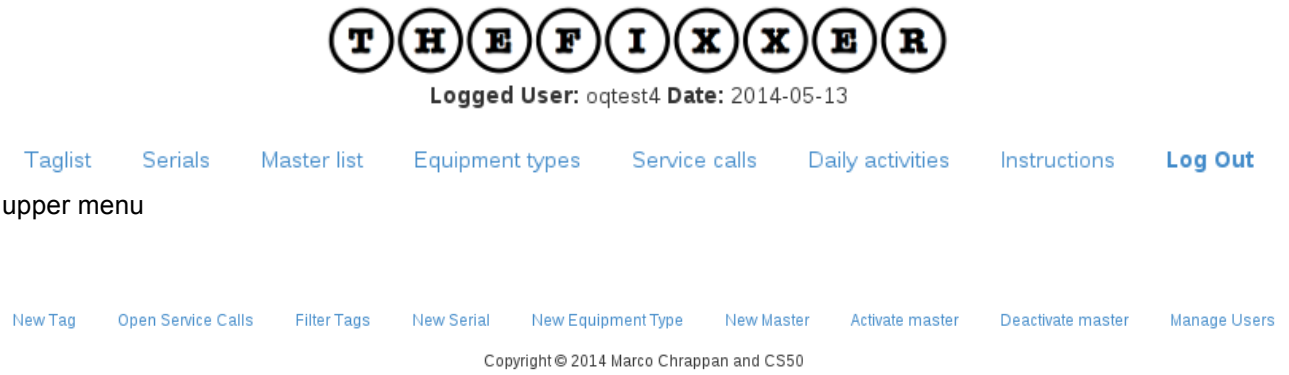
e. Dismantle tag

To dismantle a tag (for example the equipment is now out of service and need no more maintenance) the first thing to do is to edit the tag and click the reset equipment link. This will fill both the equipment type and subtype with NULL values. In this way the link between the planned maintenance and the tag is broken.

Moreover to better clarify this situation to the user, the serial number has to be switched to a new serial (create a new serial with the indication DISMANTLED or OOS and assign to the tag with switch serial).

8. Menu Structure

The interface has been designed with two static menus, the upper menu and the bottom menu:



upper menu

bottom menu

The upper menu (mainly dedicated to lists) contains the following links:

- Taglist
- Serials
- Master list
- Equipment types
- Service calls
- Daily activities (service calls happening today)
- Instructions
- Logout

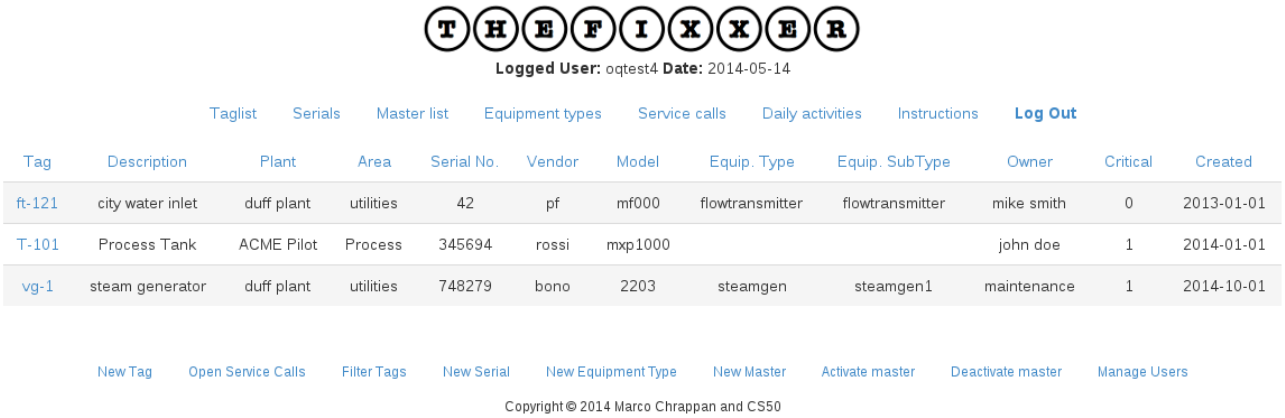
The lower menu (mainly dedicated to editing) contains the following links:

- New tag
- Open service calls (generate events)
- Filter tags (filter option for tag search)
- New serial
- New equipment type
- New master
- Activate master
- Deactivate master
- Manage users

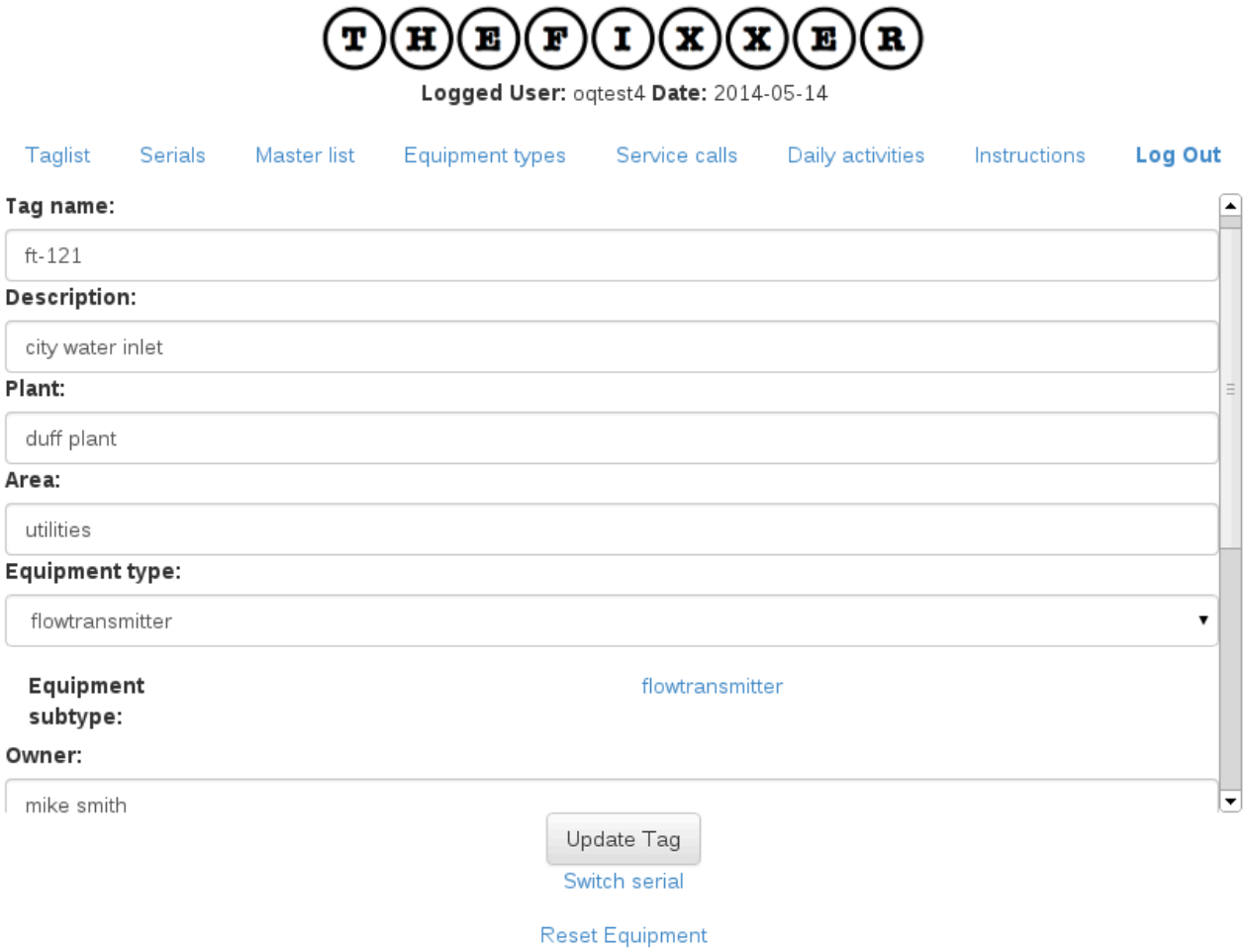
Moreover under the program logo, the current user and date showed for reference.

9. Graphic pages

Here, the most important pages are show. The following is the taglist page (main page)



Below the edit tag form is shown



In this image three links can be observed (eq subtype edit link, switch serial link and reset equipment)
The following page is the maintenance maste edit page:

Logged User: oqtest4 **Date:** 2014-05-14

Taglist Serials Master list Equipment types Service calls Daily activities Instructions **Log Out**

Master:

vg1

Rev:

12

SOP:

vmt20001

Equip Type:

steamgen

Details:

maintenance record for steam generator

Remarks:

3000 Kg-h capacity 73.9mq surface max pressure 11.76

Effective Date:

2014-01-12

Edit Work instructions

Click Edit Master to edit master work instructions in detail.

If you can't edit equipment type, first reset equipment subtypes for this master.

The following page is the filter tag page. The user can filter tag by filling one or more fields. The wildcard characted % has to be used to filter strings (example ft-% will find ft-101, ft-102, ft-200 and so on)

The following page is the service call edit page on which the call can be edited, examined and eventually closed.

10. Future development

The next revision of the fixxer will include at least the following two features:

1. Audit Trail – table recording the following info
   - User
   - Date time
   - Tag
   - Change type
   - Previous value
   - Next value

The audit trail table will be kept in order to track each change done to the system

2. PDF generator to print out maintenance master and service call in PDF format