

# labcontrol

## Installation guide

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November 26, 2009

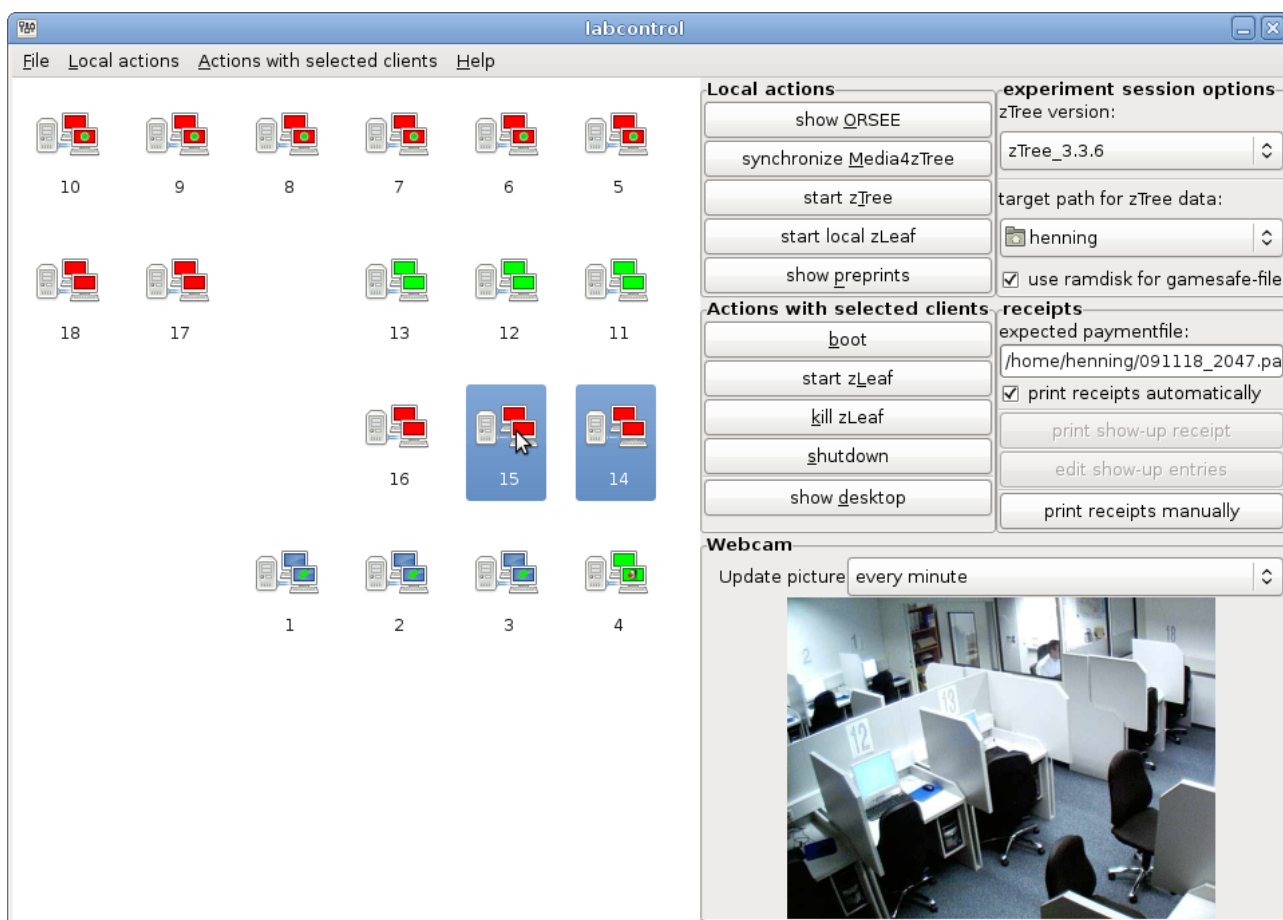
### Contents

<b>1</b>	<b>Introduction</b>	<b>2</b>
1.1	working features . . . . .	2
1.2	To-Do for later versions . . . . .	3
1.2.1	bugs, problems & improvements . . . . .	3
1.2.2	features . . . . .	3
<b>2</b>	<b>Requirements</b>	<b>3</b>
2.1	Basic environment . . . . .	3
2.2	other programs labcontrol depends on . . . . .	4
<b>3</b>	<b>Installation</b>	<b>5</b>
3.1	basics . . . . .	5
3.2	SSH: known hosts . . . . .	5
3.3	GConf Installation . . . . .	5
3.4	Customizing with GConf . . . . .	5
3.4.1	System settings . . . . .	6
3.4.2	User settings . . . . .	6
3.5	VNC . . . . .	7
<b>4</b>	<b>contact</b>	<b>8</b>

# 1 Introduction

labcontrol was intended to be an easy tool of controlling our laboratory at university and it is still in development. Primary it was not destined to run in other laboratories, too. As a result, settings were hard-encoded in the program runtime. However, we have translated it to English and made the most options configurable with Gconf.

If you miss some options or features, find bugs or just need help with installation, please do not hesitate to contact us.



## 1.1 working features

- a simple GTK-GUI, which shows the state of all clients and all possible actions
- get the current state automatically and update the GUI
- start and halt clients via wake-on-LAN and SSH
- detect all installed versions of zTree<sup>1</sup>
- starting zTree in the detected versions with directory-options

<sup>1</sup>Zurich Toolbox for Readymade Economic Experiments, <http://www.iew.uzh.ch/ztree/>

- start and kill a suitable version of `zleaf.exe` via SSH on the clients or local zleafs for testing purposes
- printing receipts immediately after zTree has written the paymentfile and creating receipts from a user-defined paymentfile
- synchronize media content required by zLeaf's Multimedia-Box via rsync
- watch the desktop of the clients via VNC
- show a picture of the laboratory's webcam and update it periodically

## 1.2 To-Do for later versions

### 1.2.1 bugs, problems & improvements

- kill some memory leaks, although they make no trouble at the moment
- implement communication between thread without GConf
- implement a ping- and netstat like tool, so that those programs with grep-parsing of the output are not longer required

### 1.2.2 features

- implementation of log supporting to allow better user-support and find bugs more easily
- implementation of a GUI to print receipts for show-up-fees
- a help-key for the clients which can be pressed when the participants have questions
- an assistant with which the user can install and distribute new ztree-versions
- a button which starts a ssh-session for the marked client and a button which executes a command on each client (i.e. for software updates)
- halt clients with sudo as normal user so that no root login is necessary
- split the sections to defaults and mandatory that changing some options require root-rights
- let the user choose the screen resolution of local zLeafs

## 2 Requirements

### 2.1 Basic environment

As mentioned in the introduction, some options are still hard-encoded in the code. So your laboratory has to meet the following limitations:

- First you should have a server which runs labcontrol and zTree and clients running zLeaf. The operating system on each computer (clients and server) should be GNU-LINUX. Microsoft Windows has never been tested, though it might work. Our laboratory runs fine with Ubuntu Linux 9.04.
- All clients should be listed in the `/etc/hosts` file of the server. The client's hostnames can be freely chosen, see below. If you want to use IP-Addresses instead of hostnames, you do not need a hosts-file.

- On each client an equal user is required, who runs zLeaf. labcontrol will connect via SSH to the clients with publickey authentication, hence publickey authentication is required for the user and root.
- Each zTree version has to be copied in `/opt/zTree_<version>` on the server and in `/home/<username>/zTree_<version>` on the clients. `<version>` can be any unique identification string. `<username>` can be any Linux-Username on the clients (it is stored in GConf, see below). Blank spaces are not recommended.
- A script `/home/<username>/start.zLeaf.sh` have to exist on each client containing

```
cd ~/$1
/usr/bin/wine zleaf.exe /server 192.168.53.100 &
exit
```

 where 192.168.53.100 is the IP of our server running zTree. Surely you can use any other IP of your server instead if you make shure that the client can reach this IP with its network settings.
- We found it helpful to use a ramdisk to store unimportant data like the Gamesafe-File. You can disable the storage of unimportant data on the ramdisk when you uncheck the checkbox "use ramdisk for gamesafe-file". Anyway, on the server a directory `/ramdisk` with read and write permission for every user have to exist. You can simply make a folder or create a "real" ramdisk(adding `none /ramdisk tmpfs defaults,size=50% 0 0` in `/etc/fstab` and reboot crates one) to meet this limitation.
- For media sharing the directory `/media4ztree` should exist on the server and the directory `/home/ewf/media4ztree` should exist on the clients.

## 2.2 other programs labcontrol depends on

We recommend to install the following programs on the server with the package manager of your choice e.g. synaptic or apt-get:

- wine
- libgnome2-0 with all dependencies
- wakeonlan to wake up the clients
- openssh-client to connect to the clients and perform most client actions like starting zLeaf
- vinagre or another VNC-client to show the desktops of the clients
- firefox or another web browser to view ORSEE<sup>2</sup>
- latex, dvips, ps2pdf, lpr to generate and print receipts
- evince or any other Postscript-viewer to view the receipts

On the clients you have to install the following programs:

- wine
- openssh-server

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<sup>2</sup>Online Recruitment System for Economic Experiments, <http://www.orsee.org>

- a VNC-Server of your choice, e.g. `x11vnc`<sup>3</sup>

## 3 Installation

### 3.1 basics

To install to GUI, extract the archive to any suitable folder, e.g. `/opt/labcontrol`.

### 3.2 SSH: known hosts

SSH verifies the identity of the clients while connecting. Hence SSH needs a `ssh_known_hosts` list. We recommend to store the list as `/etc/ssh/ssh_known_hosts` to make it available for any user.

If there is an unknown client, SSH will enquire you on stdin, so you will not see it unless you are starting labcontrol inside a terminal. If you want to perform an action on those unknown client, the GUI will not receive any user input (=“hang up”) until you answered the question on stdin.

### 3.3 GConf Installation

You should provide a few system-wide GConf pre-settings and schemas. Simply create a folder `/etc/gconf/gconf.xml.labcontrol/` on your server and move `%gconf_tree.xml`-file in this folder. Then append

```
# labcontrol default settings
xml:readonly:/etc/gconf/gconf.xml.labcontrol
```

to `/etc/gconf/2/local-defaults.path` and restart the GConf-daemon or simply your computer. Afterwards, if you start `gconf-editor`, you should find a labcontrol-folder in the `/apps-tree`.

### 3.4 Customizing with GConf

After installing our GConf-template, you should customize the settings by changing the `%gconf_tree.xml` with your preferred editor. The `gconf_tree` is an xml-document; at the beginning the variables are defined and afterwards they are described with an “scheme”. In this scheme the defaults are set that should be edited.

The options are divided into system configuration, user configuration and temporary data. The system settings should only be adapted to your laboratory once. User settings may be changed by the user if he want to work with different programs or an unique receipt design (see below). Temporary settings are not relevant for you, they will be changed very often on runtime.

The following table explains the possible options (options that will only be used in future versions are marked with an asterisk).

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<sup>3</sup>Because of performance reasons we use blackbox as display manager instead of Gnome. If you want to use Gnome, maybe `vino` would be better. However, we have not tested `vino`.

### 3.4.1 System settings

key	type	default value
symbols_no_cols	int	6
<i>Explanation:</i> The icons in the following list will be divided in this number of columns.		
symbols	list of int	10; 9; 8; ...
<i>Explanation:</i> Each entry stands for an icon in the GUI. Free spaces are listed as zero.		
client_hostnames	list of string	client01; ...
<i>Explanation:</i> List of the hostnames of the client. If SSH wants to connect to client no 10, it will take the 10th entry of this list. You can also insert IP-addresses here, if your clients are not listed in <code>/etc/hosts</code> .		
network_broadcast_address	string	192.168.53.255
<i>Explanation:</i> Broadcast address of the client's subnet. Wake-on-Lan will use it to select the correct network interface if you have more than one.		
MACs	list of string	00:17:31:5F:7E:21; ...
<i>Explanation:</i> The MAC-addresses of the clients are listed here. If Wake-on-Lan wake up client no 10, it will take the 10th entry of this list (like <code>client_hostnames</code> ).		
user_name_on_clients	string	ewf
<i>Explanation:</i> The Linux user name which will run zLeaf on the clients. You have to use an identical user name on every client.		
publickey_path_user	string	/opt/...
<i>Explanation:</i> The full path to your private key with which you can login via SSH on the clients as user defined in the previous option. Attention: If the publickey authentication fails, ssh will maybe ask for a password on the command line. Until you do not type in the correct password, labcontrol do not respond to any user input.		
publickey_path_root	string	/opt/...
<i>Explanation:</i> The full path to your private key with which you can login via SSH on the clients as root. You can use the same publickey for the standard user and for root.		
po_file_directory	string	/opt/labcontrol/po
<i>Explanation:</i> Path to the directory containing the .po-files for localization.		
glade_file	string	/opt/labcontrol/labcontrol.glade
<i>Explanation:</i> Full path to the labcontrol.glade-file for creating the GUI.		
zleaf_screen_resolutions*	string	1280x1024; 1024x768; ...
<i>Explanation:</i> Gives all possible screen resolutions, which will be selectable when starting zLeaf.		

### 3.4.2 User settings

key	type	default value
receipts_latex_header	string	\documentclass ...

<i>Explanation:</i> The $\LaTeX$ header that will be used to create the receipts. You can enter normal $\LaTeX$ -code here to create your own layout. Beside the general options you have to define an environment <code>\GAINRECEIPT</code> and <code>\LOSSRECEIPT</code> , both with the parameter <code>client</code> , <code>name</code> and <code>amount</code> . Also the beginning of the overview-table need to be defined. <code>EXPERMENTNAME</code> will be replaced with the name of the paymentfile.		
VNC_viewer	string	vinagre -n
<i>Explanation:</i> The VNC-client of your choice to view the client's desktops.		
PS_viewer	string	evince
<i>Explanation:</i> The PS-viewer of your choice to view the readymade receipts.		
webcam_picture_source	string	http://...
<i>Explanation:</i> In a periodical interval -depending on the value of <code>webcam_update_period</code> - the picture of your webcam will be updated. This variable contains the path, where labcontrol can find the current picture. You can use every Gnome-URI here.		
webcam_update_period	int	2
<i>Explanation:</i> This is the index of the preselected item of the <code>webcam_update_combobox</code> . Possibles values are 0 (=never (webcam is disabled, no picture is shown)), 1 (=every 10 minutes), 2 (=every minute), 3 (=every 10 seconds), 4 (=every second) or 5 (=whenever idle).		
ORSEE_command	string	firefox http://...
<i>Explanation:</i> This command will be executed, if the user presses "show ORSEE" in the GUI.		
preprints_command	string	nautilus /opt/...
<i>Explanation:</i> This command will be executed, if the user presses "show preprints" in the GUI.		

Every user can overwrite the system-wide preferences with own values (using `gconf-editor`), i.e. to use his own layout for receipts.

If you do not want to permit changes, you can set the value as mandatory with `gconf-editor`. You can find further information about GConf at <http://library.gnome.org/admin/system-admin-guide/stable/gconf-0.html.en>

At the moment, the parameter documentation of the GConf-values are only in german, but an english version will follow.

### 3.5 VNC

If you want to be able to view the client's desktop over VNC, you have to install a VNC-server on the clients and i.e. `vinagre` on the server. We choose `vinagre`, because it is able to scale from client's desktop size to your window size. However, every user have to create a symlink to the `vinagre-bookmark` file. If you never used `vinagre` before, every user should execute

```
mkdir -p ~/.local/share/vinagre
ln -s /opt/labcontrol/vinagre-bookmarks.xml ~/.local/share/vinagre/
```

in a terminal. If you know a better way, please inform us.

## 4 contact

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