Actiserver Setup

Pre-requisites

A computer with both Ethernet and WiFi interfaces

Linux installed and an administrator account set up with sudo permissions (Ubuntu or Debian, Debian Bookworm server works fine)

Software installation. Run the following commands:

*sudo apt update*

*sudo apt -y upgrade*

*sudo apt -y install ntp ntpstat net-tools iw inxi git openjdk-17-jre apache2*

*sudo apt -y install autofs cifs-utils sysstat*

*sudo mkdir -p /media/actimetre*

Choose a number between 100 and 899 for this Actiserver (we will call it **NNN**). Please ensure no two Actiservers have the same number.

For a PC (on Ubuntu)

Using the Advanced Network Configuration program (found in the “Utilities” folder), set up the WiFi AP with SSID in the form of “ActisNNN” and password “NNNanimalerie” where NNN is the same. The “Band” must be set to “B/G”, and the channel can be chosen according to the environment, or left to 0 to let the system decide.

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자동 생성된 설명텍스트, 전자제품, 스크린샷, 디스플레이이(가) 표시된 사진

자동 생성된 설명

That’s all. Jump to the section “Set up the shared server”

For a Raspberry

Install additional software

*sudo apt install hostapd dnsmasq dhcpcd5*

For an Raspberry clone (our preference goes to OrangePi), ensure that NetworkManager is not running

*sudo systemctl disable NetworkManager*

Find the name of the WiFi device: run the following command

*ifconfig*

and note down the name of the WiFi device (wlo1 in the example below)

enp89s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500

inet 192.168.1.200 netmask 255.255.255.0 broadcast 192.168.1.255

inet6 fe80::b9ee:2b0c:38a5:efb0 prefixlen 64 scopeid 0x20<link>

ether 1c:69:7a:af:d2:2a txqueuelen 1000 (Ethernet)

RX packets 272033 bytes 346345738 (330.3 MiB)

RX errors 0 dropped 0 overruns 0 frame 0

TX packets 139924 bytes 17397499 (16.5 MiB)

TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

device memory 0x6a200000-6a2fffff

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536

inet 127.0.0.1 netmask 255.0.0.0

inet6 ::1 prefixlen 128 scopeid 0x10<host>

loop txqueuelen 1000 (Local Loopback)

RX packets 24485 bytes 3043795 (2.9 MiB)

RX errors 0 dropped 0 overruns 0 frame 0

TX packets 24485 bytes 3043795 (2.9 MiB)

TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

wlo1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500

inet 192.168.200.1 netmask 255.255.255.0 broadcast 192.168.200.255

ether 8c:1d:96:c5:4d:b0 txqueuelen 1000 (Ethernet)

RX packets 816272 bytes 88336954 (84.2 MiB)

RX errors 0 dropped 0 overruns 0 frame 0

TX packets 817235 bytes 59169904 (56.4 MiB)

TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

WiFi AP setting

Run the following:

*sudo systemctl unmask hostapd*

*sudo systemctl enable hostapd*

In the file /etc/hostapd/hostapd.conf (create it if it doesn't exist), add the following, where **NNN** is a number between 002 and 250. The leading zeros are important, so there are exactly 3 digits. The name wlo1 comes from the information gathered before.

country\_code=FR

interface=wlo1

ssid=Actis**NNN**

hw\_mode=g

channel=7

macaddr\_acl=0

auth\_algs=1

ignore\_broadcast\_ssid=0

wpa=2

wpa\_passphrase=**NNN**animalerie

wpa\_key\_mgmt=WPA-PSK

wpa\_pairwise=TKIP

rsn\_pairwise=CCMP

Note: it is recommended that each Actiserver use a different channel number (7 in the example above).

In the file /etc/dhcpcd.conf, add the following:

interface **wlo1**

static ip\_address=192.168.4.1/24

nohook wpa\_supplicant

In /etc/dnsmasq.conf, add the following at the end of the file:

*interface=****wlo1***

*dhcp-range=192.168.4.2,192.168.4.250,255.255.255.0,24h*

*domain=wlan*

*address=/gw.wlan/192.168.4.1*

Run the following to finalize the configuration and reboot:

*sudo rfkill unblock wlan*

*sudo reboot*

For other Linux systems (use with caution, this procedure might not work at all ! prefer the previous)

The procedure described above for Raspberry Pi should work on most systems. However, if the system has Network Manager enabled, try the following command, then reboot.

*sudo nmcli d wifi hotspot ifname* ***wlo1*** *ssid Actis****NNN*** *password* ***NNN****animalerie*

*sudo reboot -f now*

if after reboot the AP Actis**NNN** does not persist,

create a file /etc/system/system/Actis**NNN**.service, add the following content to the file

[Unit]

Description=AP-Activation

Wants=network-online.target multi-user.target

[Service]

Type=oneshot

User=root

ExecStart=/usr/bin/nmcli d wifi hotspot ifname **wlo1** ssid Actis**NNN** password **NNN**animalerie

Restart=no

[Install]

Set up the shared file server. Follow instructions to set up mounting fatadata

The mount point must be /media/actimetre

Set up the NTP server. In case the installation is behind a slow firewall, the NTP synchronization might be problematic. It is usefull in that case to point to a NTP time server that can be accessed locally

The config file is /etc/ntp.conf

Add the address of the local NTP server (here 172.20.163.1)

#Specify one or more NTP servers.

server 172.20.163.1

Comment the servers from the NTP Pool project

# Use servers from the NTP Pool Project. Approved by Ubuntu Technical Board

# on 2011-02-08 (LP: #104525). See http://www.pool.ntp.org/join.html for

# more information.

#pool 0.ubuntu.pool.ntp.org iburst

#pool 1.ubuntu.pool.ntp.org iburst

#pool 2.ubuntu.pool.ntp.org iburst

#pool 3.ubuntu.pool.ntp.org iburst

Set up Apache Web server

Open the file /etc/apache2/sites-available/000-default.conf and find the line

DocumentRoot /var/www

Change it to

DocumentRoot /media/actimetre/

In /etc/apache2/apache2.conf, find the line

<Directory /var/www/>

Replace it with

<Directory /media/actimetre/>

Restart Apache:

*sudo systemctl restart apache2*

Create an account for actiserver

You can use an existing account, or create an account specifically for running Actiserver.

*sudo adduser actiserver*

Make sure the REPO\_ROOT directory belongs to actiserver

*sudo chown actiserver /media/actimetre*

Install Actiserver software

In a new directory:

*git clone https://github.com/jay1han/V2-Actiserver-executables.git*

This creates a directory named V2-Actiserver-executables.

If you use a different account for running Actiserver, make sure that the User directive in actiserver.service properly names that account:

[…]

[Service]

Type=simple

User=actiserver

ExecStart=/usr/bin/java -jar /etc/actimetre/Actiserver-2.0.jar

[…]

Make the installation by running:

*cd V2-Actiserver-executables*

*sudo ./install.sh*

Configure

Edit the file /etc/actimetre/actiserver.conf as needed:

VERBOSITY = 10 *Log verbosity*

REPO\_ROOT = /media/actimetre *the mount point of the file server*

MAX\_REPO\_SIZE = 1\_000\_000\_000 *maximum size of a data file before a new one is created*

MAX\_REPO\_TIME = 24 *maximum age (in hours) of a data file*

INCLUDE\_GZ = false *(version >= 340) include Gz data in CSV*

OUTPUT\_RAW = true *(version >= 340) output raw data in CSV*

OUTPUT\_VECTORS = false *(version >= 340) output vector sizes in CSV*

CLEANUP\_EXEC = *(version >= 350) command to execute when disk space gets low*

SYNC\_EXEC = *(version >= 350) command to sync data file to server*

SECRET\_KEY = SecretKeyOnlyAlphanumsAllowed

The SECRET\_KEY is an alphanumeric string that is shared with Acticentral. Please see Acticentral’s installation documentation on how to configure it on Acticentral.

SYNC\_EXEC is a plain string that is invoked as if typed in a console. If present, the substring $ will be replaced by the full path to the data file to sync. For example, the configuration string “/usr/bin/mv $ /dev/null” will result in the invocation of “/usr/bin/mv /media/actimetre/Project01/Actim0011-1A\_2020-01-01\_000000.csv /dev/null”. The file should be erased at the end of execution of this command before returning.

Note: please do not add any lines or comments. The parser if very simple and will be confused.

Run the Actiserver

The following command will install the program in the system and make it run automatically:

*sudo ./run.sh*

Actiserver is now running

To stop it, run the following command. But it will restart when the computer is rebooted.

*sudo systemctl stop actiserver*

To disable it, so it doesn't start automatically after a reboot:

*sudo systemctl disable actiserver*

Actimetre Dashboard

The Actimetre Dashboard is available at https://actimetre.u-paris-sciences.fr/. You need a login and a password to gain access; please contact boris.lamotte-incamps@u-paris.fr.

The graph chart shows the status of the Actimetre over the past 7 days (if available), in the form of its sampling frequency, from 100 to 4000Hz, over time. The date/time above shows the starting point of the graph. When the Actimetre is turned off, the graph drops at “0” and is shown in red color. The green bar shows the length of the latest uninterrupted operation of the Actimetre. The “scissors” button lets you cut the graph down to the latest green bar, i.e. forget previous runs.

“Signal” shows the WiFi signal strength as seen from the Actimetre. “Rating” is the percentage of missed sampling cycles during the latest up period. This is an indicator of the connectivity between the Actimetre and the Actiserver it’s connected to.

You can click on the Project title to enter the project management screen. From there, you can reassign an Actimetre to a different project, and in general view the Project status.

In the Actiservers list, if that server uses local storage (see settings for Actiserver), you can click on the Data size information to retrieve the full list of files, and directly download them from the Actiserver. This will only work if the Actiserver has a valid, reachable IP address assigned to it.

Note that there is NO ACCESS CONTROL, so anyone can change any information. Please be careful.

Also note, all date/times are in UTC. This is to avoid dealing with DST.

Please keep in mind that Acticentral does NOT manage the repository. It is the user’s responsibility to copy, process, and clean the repository of data. The files are all clearly labelled with “ActimXXXX”, but please be careful when managing the repository, to avoid erasing or misplacing important data.

Since version 350, CSV files are stored in REPO\_ROOT/Project##/Actim… Also, a new configuration option, SYNC\_EXEC, designates a program or script that should take a file and move it to an appropriate storage server. The file must be erased once it is safely copied out. In case of straggling files (e.g. if Actimetre stops working inadvertently, and we still want to copy the remaining data), a “Sync” button is available on the Dashboard’s Project page to force a sync. That button disappears once the sync is complete.

Actimetre and Project assignment protocol

Bringing up a new Actimetre:

* After the Actimetre has been flashed, connect at least one sensor and power it up near a running Actiserver
* It connects and gets assigned a unique Actim number and shows up on the Dashboard
* Initially, it goes in the pool of “Not assigned” Actimetres. It doesn’t store any data, and its LED blinks rapidly.
* On the Dashboard, go into the “to assign” page, then click the “Move” button next to the Actimetre
* You can select an existing project, or create a new one

Moving an Actimetre to another project

* From the Dashboard, click the “Stop” button
* Make sure all data files have been processed and saved; “No data” shows on the Dashboard
* When there is no more outstanding data file for that Actimetre in its current Actiserver, the Dashboard shows the “Move” and “Remove” buttons

It is good practice to move an unused Actimetre to the “Not assigned” pool as soon as possible.

Actimetre

The display on the Actimetre is organized as below

|  |  |
| --- | --- |
| **v200>0004 123**  **1AB2AB S2x@100**  **5h45 3.4**  **M0 E0 Q0%** | Software version > Actimetre ID – Server ID  Sensors – Board type @ Frequency(Hz)  Time since boot – Average performance (lower is better)  Missed cycles – I2C read errors – Queue occupation% |

To use the lastest version of the Actimetre firmware

Install Github desktop from https://desktop.github.com/

File > Clone Repository > URL tab

In the URL enter: https://github.com/jay1han/V2-Actimetre-binaries.git

Choose a convenient folder to put it. Please remember where, we’ll need it later.

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자동 생성된 설명

The download tool is included in the Run the Flash Download Tool. Select ESP32-S2 as the chip type and USB as the mode.

For the ESP32-S3 board, select ESP32-S3 in “ChipType”.

텍스트, 스크린샷, 번호, 폰트이(가) 표시된 사진

자동 생성된 설명

Enter the fields as shown, replacing the file path with the correct directory you’ve cloned the Git into. Enter the right addresses on the right-hand side and check the checkboxes on the left-hand side. Make sure the COM number corresponds to the S2 mini board, anc check the BAUD rate is set at 921600.

텍스트, 스크린샷, 소프트웨어, 디스플레이이(가) 표시된 사진

자동 생성된 설명

For the S3, the addresses are slightly different (bootloader goes at 0x0000).

텍스트, 폰트, 직사각형, 스크린샷이(가) 표시된 사진

자동 생성된 설명

Place the board in download mode: while the board is powered, press Reset and keep it pressed, then press Boot (marked “0”), then release Reset and release Boot. Click Start and wait.

When the display turns blue “FINISH”, it’s done.