

LOW-COST LORA GATEWAY: WEB ADMIN INTERFACE



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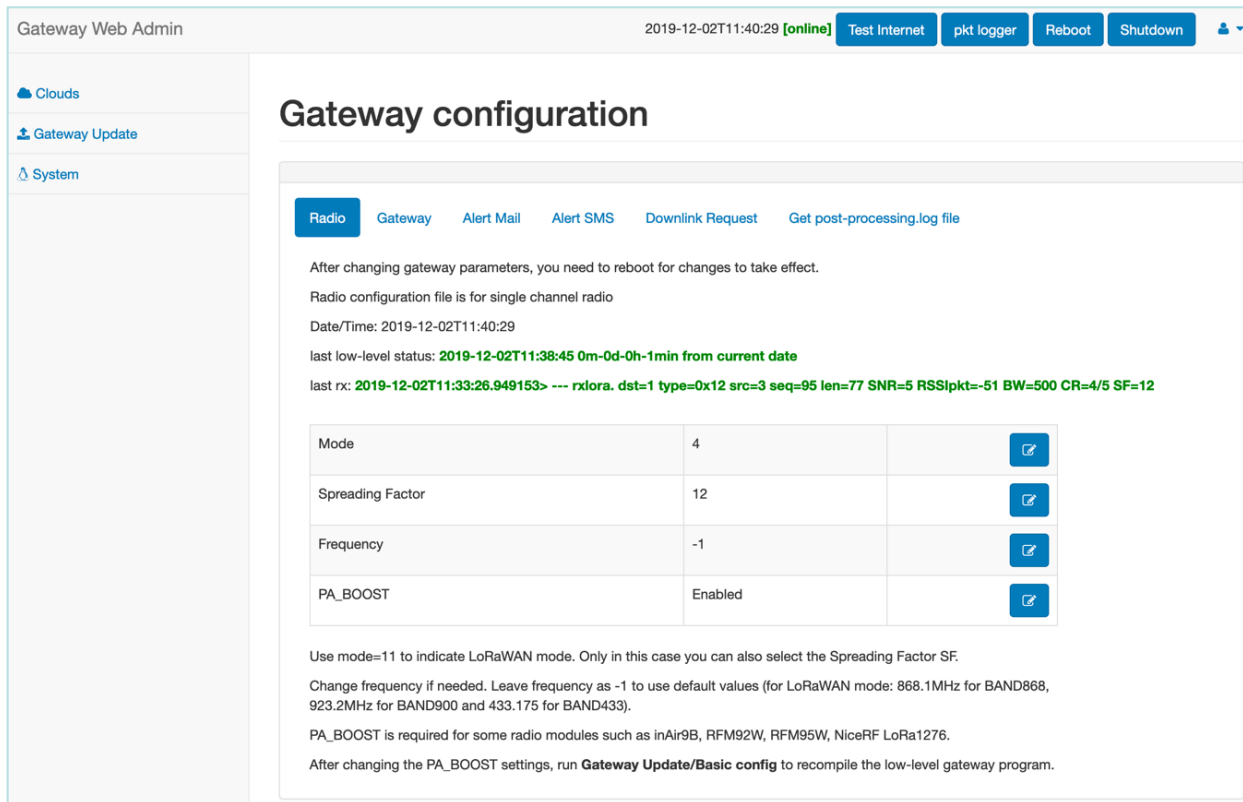
- ❑ This tutorial presents the web admin interface which is an add-on to the low-cost gateway
- ❑ Please read first the [Low-cost LoRa gateway: a step-by-step](#) tutorial to understand the gateway configuration and architecture
- ❑ Note that the SD card image has everything needed, including the web admin interface installed, so you may skip the installation procedure if you flashed the SD card image
- ❑ Let's get started...

GATEWAY WEB ADMIN INTERFACE (1)

- ❑ A gateway web admin interface has been added to the latest version
- ❑ To install the web admin interface, check if you have the `gw_web_admin` folder in your `lora_gateway` folder
- ❑ If you don't, then update to the latest version
- ❑ Then, go into `gw_web_admin` and run the `install.sh` script
 - ❑ `cd gw_web_admin`
 - ❑ `sudo ./install.sh`

GATEWAY WEB ADMIN INTERFACE (2)

- ❑ <http://192.168.200.1/admin> (with WiFi access)
- ❑ Login: admin
- ❑ Password: loragateway







Gateway Web Admin 2019-12-02T11:40:29 [online] Test Internet pkt logger Reboot Shutdown

Clouds Gateway Update System

Gateway configuration

Radio Gateway Alert Mail Alert SMS Downlink Request Get post-processing.log file

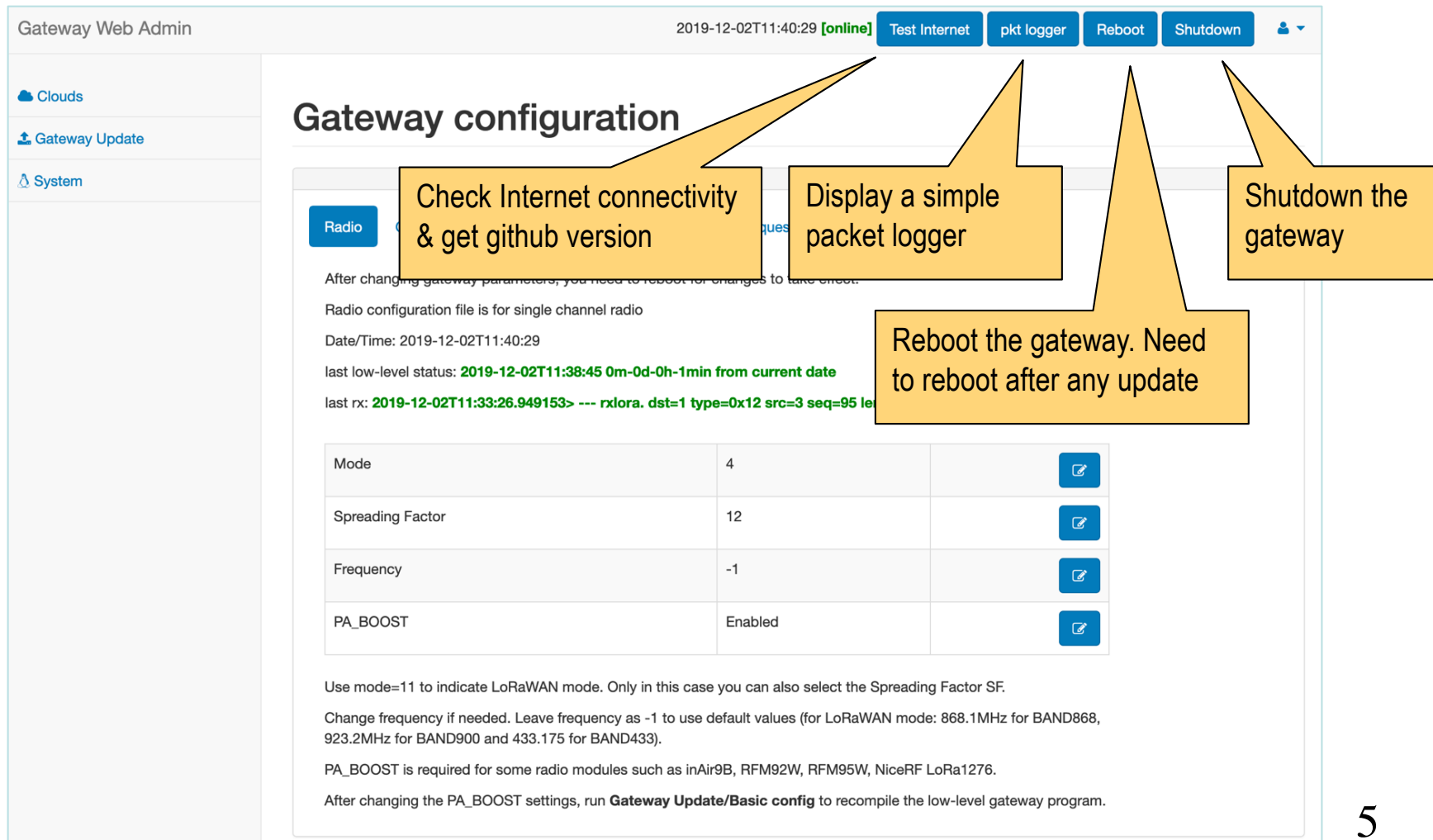
After changing gateway parameters, you need to reboot for changes to take effect.
Radio configuration file is for single channel radio
Date/Time: 2019-12-02T11:40:29
last low-level status: 2019-12-02T11:38:45 0m-0d-0h-1min from current date
last rx: 2019-12-02T11:33:26.949153> --- rxlor. dst=1 type=0x12 src=3 seq=95 len=77 SNR=5 RSSIpkt=-51 BW=500 CR=4/5 SF=12

Mode	4	
Spreading Factor	12	
Frequency	-1	
PA_BOOST	Enabled	

Use mode=11 to indicate LoRaWAN mode. Only in this case you can also select the Spreading Factor SF.
Change frequency if needed. Leave frequency as -1 to use default values (for LoRaWAN mode: 868.1MHz for BAND868, 923.2MHz for BAND900 and 433.175 for BAND433).
PA_BOOST is required for some radio modules such as inAir9B, RFM92W, RFM95W, NiceRF LoRa1276.
After changing the PA_BOOST settings, run **Gateway Update/Basic config** to recompile the low-level gateway program.

GATEWAY MAIN PAGE

□ Gateway main page (configuration page)



Gateway Web Admin 2019-12-02T11:40:29 [online] Test Internet pkt logger Reboot Shutdown

Gateway configuration

Radio

Check Internet connectivity & get github version

Display a simple packet logger

Shutdown the gateway

Reboot the gateway. Need to reboot after any update





After changing gateway parameters, you need to reboot for changes to take effect.

Radio configuration file is for single channel radio

Date/Time: 2019-12-02T11:40:29

last low-level status: 2019-12-02T11:38:45 0m-0d-0h-1min from current date

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MAIN GATEWAY CONFIGURATION (1)

□ radio configuration section

Gateway Web Admin 2019-12-02T11:40:29 [online] Test Internet pkt logger Reboot Shutdown

Clouds Gateway Update System

Gateway configuration

Radio Gateway Alert Mail Alert SMS Downlink Reboot Alert post-processing.log file

After changing gateway parameters, you need to reboot the gateway for changes to take effect.

Radio configuration file is for single channel radio

Date/Time: 2019-12-02T11:40:29

last low-level status: 2019-12-02T11:38:45 0m-0d-0h-1min from current date

last rx: 2019-12-02T11:33:26.949153> --- rxloro. dst=1 type=0x12 src=3 seq=95 len=77 SNR=5 RSSIpkt=-51 BW=500 CR=4/5 SF=12

Mode	4
Spreading Factor	12
Frequency	-1
PA_BOOST	Enabled

Use mode=11 to indicate LoRaWAN mode. Only in this case you can also select the Spreading Factor SF.

Change frequency if needed. Leave frequency as -1 to use default values (for LoRaWAN mode: 868.1MHz for BAND868, 923.2MHz for BAND900 and 433.175 for BAND433).

PA_BOOST is required for some radio modules such as inAir9B, RFM92W, RFM95W, NiceRF LoRa1276.

After changing the PA_BOOST settings, run **Gateway Update/Basic config** to recompile the low-level gateway program.

Indicate a single-channel or SX1301 concentrator hardware configuration

Last status from low-level radio layer, normally every 10mins

Last radio packet reception time

Change LoRa mode
Mode 11 indicates LoRaWAN mode

Set to a customized frequency band, e.g. 433.3MHz

Edit PA_BOOST setting. You must use **Gateway update/Basic config** to recompile

MAIN GATEWAY CONFIGURATION (2)

□ Gateway configuration section

Radio **Gateway** Alert Mail Alert SMS Downlink Request Get post-processing

After changing gateway parameters, you need to reboot for changes to take effect

Gateway ID	0000B827EBD4F300	
Gateway ID MD5 hashed	08e548ec455fff4674759f043fbf1017	not editable
IP address	10.0.13.188	editable
MAC addresss	eth0: b8:27:eb:d4:f3:00	not editable
GPS coordinates	Latitude : 43.314106 Longitude : -0.363887	
wappkey	false	
raw format	false	
aes_lorawan	false	
aes	false	
lsc	false	
downlink	0	
status	600	

Set gateway ID (should normally be pre-configured)

Default id is 0000XXXXXXXXXXXX with the 6 bytes of the MAC address of the gateway network interface (e.g. B827EBD4F300)

Indicate raw format to handle customized packet format. Required for LoRaWAN mode

Set the downlink timer in seconds, 0 means no downlink support

Set the periodic status timer in seconds, 0 means no periodic status tasks

The MD5 hash of the gateway's ID




Enables local decryption at gateway. Decryption keys must be defined

MAIN GATEWAY CONFIGURATION (3)

□ Gateway email alerting section

Radio Gateway **Alert Mail** Alert SMS Downlink Request Get post-processing.log file

After changing gateway parameters, you need to reboot for changes to take effect.

Enabled	false	
Mail Account	a_gmail_address	
Mail Password	7c9268550caa0e9c6b282d2fe9946e89	
Mail Server	smtp.gmail.com	
Contacts	the_contact_mail_address,another_contact_mail_address_if_needed	

Enter your mail address for sending emails

The SMTP mail server to send emails

Your email account password, what is displayed is the MD5 hash version




A list of email recipient addresses to receive alert notifications

MAIN GATEWAY CONFIGURATION (4)

□ Gateway SMS alerting section (needs 2G/3G)

Radio Gateway Alert Mail **Alert SMS** Downlink Request Get post-processing.log file

After changing gateway parameters, you need to reboot for changes to take effect.

Enabled	false	
Pin code	0000	
Contacts	+33XXXXXXXXX, +33XXXXXXXXX	

The SIM card pin code

A list of mobile phone numbers to receive alert notifications

MAIN GATEWAY CONFIGURATION (5)

□ Gateway generating downlink messages

Radio Gateway Alert Mail Alert SMS **Downlink Request** Get post-processing.log file

After changing gateway parameters, you need to reboot for changes to take effect.

Destination node, between 2 and 255

Destination
Between 2 and 255

Message
message

Submit Clear

The string to send. Can be specific commands for the device if it has been programmed/configured accordingly.

Submit will generate in the downlink folder a downlink-post.txt file with the following entry for instance:
`{"status": "send_request", "dst": 2, "data": "hello from gateway"}`

More info on
https://github.com/CongducPham/LowCostLoRaGw/blob/master/gw_full_latest/README-downlink.md

MAIN GATEWAY CONFIGURATION (6)

□ Gateway log files section

(1) Select this tab

(2) Click to start the generation of a copy of the log files

Radio Gateway Alert Mail Alert SMS Downlink Request **Get post-processing.log file**

After changing gateway parameters

Then, this is the link to the entire `post-processing.log` file



Copy the current post-processing.log file, extract last 500 lines in a separate file and make links below available for download).

The entire content of post-processing.log

[click here](#)

Last 500 lines of post-processing.log

[click here](#)

And this is the link to an extract containing the last 500 lines of `post-processing.log` file

GET GATEWAY LOG FILES

- ❑ The **Get post-processing.log file** option is a convenient way for an end-user to obtain the log file that can be sent (mail) to an experienced user for analysis or debug purposes
- ❑ The entire `post-processing.log` file can be obtained, or only the last 500 lines
- ❑ A simple packet logger page is more suitable to check in real time whether packets are received or not, see next slide

SIMPLE PACKET LOGGER

Real-time packet logger

Gateway Web Admin 2019-12-02T13:41:29 [online] Test Internet pkt logger Reboot Shutdown

Clouds Gateway Configuration Gateway Update

Packet logger

Display the packet logger

rxlora

Showing last 15 packet reception. Refreshing every 5s.

2019-12-02T13:32:18.411216> --- rxlora. dst=1 type=0x12 src=3 seq=106 len=77 SNR=7 RSSIpkt=-48 BW=500 CR=4/5 SF=12
2019-12-02T13:21:30.086689> --- rxlora. dst=1 type=0x12 src=3 seq=105 len=77 SNR=7 RSSIpkt=-48 BW=500 CR=4/5 SF=12
2019-12-02T13:10:41.766643> --- rxlora. dst=1 type=0x12 src=3 seq=104 len=77 SNR=7 RSSIpkt=-50 BW=500 CR=4/5 SF=12
2019-12-02T12:59:53.443855> --- rxlora. dst=1 type=0x12 src=3 seq=103 len=77 SNR=7 RSSIpkt=-48 BW=500 CR=4/5 SF=12
2019-12-02T12:49:05.123943> --- rxlora. dst=1 type=0x12 src=3 seq=102 len=77 SNR=6 RSSIpkt=-50 BW=500 CR=4/5 SF=12
2019-12-02T12:38:16.799475> --- rxlora. dst=1 type=0x12 src=3 seq=101 len=77 SNR=7 RSSIpkt=-48 BW=500 CR=4/5 SF=12
2019-12-02T12:27:28.457428> --- rxlora. dst=1 type=0x12 src=3 seq=100 len=77 SNR=7 RSSIpkt=-48 BW=500 CR=4/5 SF=12
2019-12-02T12:16:40.044277> --- rxlora. dst=1 type=0x12 src=3 seq=99 len=77 SNR=6 RSSIpkt=-50 BW=500 CR=4/5 SF=12
2019-12-02T12:05:51.648896> --- rxlora. dst=1 type=0x12 src=3 seq=98 len=77 SNR=6 RSSIpkt=-49 BW=500 CR=4/5 SF=12
2019-12-02T11:55:03.335889> --- rxlora. dst=1 type=0x12 src=3 seq=97 len=77 SNR=6 RSSIpkt=-49 BW=500 CR=4/5 SF=12
2019-12-02T11:44:15.194016> --- rxlora. dst=1 type=0x12 src=3 seq=96 len=77 SNR=4 RSSIpkt=-52 BW=500 CR=4/5 SF=12
2019-12-02T11:33:26.949153> --- rxlora. dst=1 type=0x12 src=3 seq=95 len=77 SNR=5 RSSIpkt=-51 BW=500 CR=4/5 SF=12
2019-12-02T11:22:38.623943> --- rxlora. dst=1 type=0x12 src=3 seq=94 len=77 SNR=5 RSSIpkt=-50 BW=500 CR=4/5 SF=12
2019-12-02T11:11:50.253460> --- rxlora. dst=1 type=0x12 src=3 seq=93 len=77 SNR=6 RSSIpkt=-48 BW=500 CR=4/5 SF=12
2019-12-02T11:01:01.843182> --- rxlora. dst=1 type=0x12 src=3 seq=92 len=77 SNR=7 RSSIpkt=-49 BW=500 CR=4/5 SF=12

Show in real-time the last 15 packet receptions

GATEWAY UPDATE

- ☐ Your gateway will be updated to the latest version
- ☐ Internet access for the gateway is necessary
- ☐ The update procedure can easily be done with the web admin interface, connect to the gateway WiFi first
- ☐ The update steps are
 - 1 Full Update
 - 2 Basic Config
 - 3 Update Web Interface

GATEWAY UPDATE PAGE

Gateway update section

The screenshot shows the 'Gateway Web Admin' interface. The left sidebar contains links for 'Clouds', 'Gateway Configuration', and 'System'. The main content area is titled 'Gateway Update' and features five tabs: 'New Installation', 'Full update', 'Basic config', 'Download and install a file', and 'Update web admin interface'. Below the tabs, the 'New Installation' tab is active, showing instructions to 'Install latest version of gateway, erasing all existing configuration files. Custom SSID will be preserved. May take minutes, wait for firm...'. It also displays 'Git version: 313' and 'Firmware version: 313. Date of current distribution: 2020-08-10'.

1 Install a new gateway by removing the existing `lora_gateway` folder, all existing configuration files will be overwritten.

If you install a new gateway with our SD card image, you can use this option.

Can download and install a file in the `lora_gateway` folder. A link to a file should be provided, e.g. a Dropbox link

2 Compile and configure the gateway (to set the gateway id & the WiFi access point SSID). This is also required if you install a new gateway using the provided SD card image. It is recommended to run **Basic config** right after **Full update** or **New installation**


3 Update the web admin interface after an update of the distribution to install the last version of the web admin interface.

It is recommended to run **Update web admin** right after **Full update** or **New installation**. Then reload the page.

SOFTWARE VERSION NUMBER

Gateway Update

[New Installation](#) [Full update](#) [Basic config](#) [Download and install a file](#) [Update web admin interface](#)

 Install latest version of gateway, **erasing** all existing configuration file.
Custom SSID will be preserved. May take minutes, wait for finish notification.

Git version: 313. Installed version: 313. Date of current distribution is 2018-06-21 16:28:07.326390425 +0200

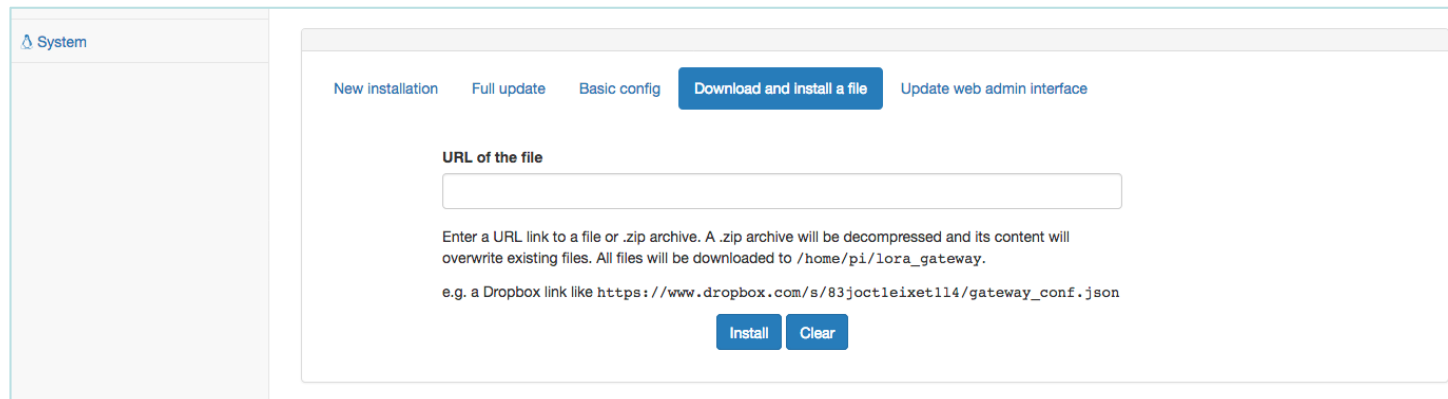
- ❑ The software version number on github and the installed version number are displayed
- ❑ Click on [Test Internet](#) to obtain the latest software version number on github

Online. Got github version number. 2019-12-02T13:44:29 **[online]**

[Test Internet](#)[pkt logger](#)[Reboot](#)[Shutdown](#)

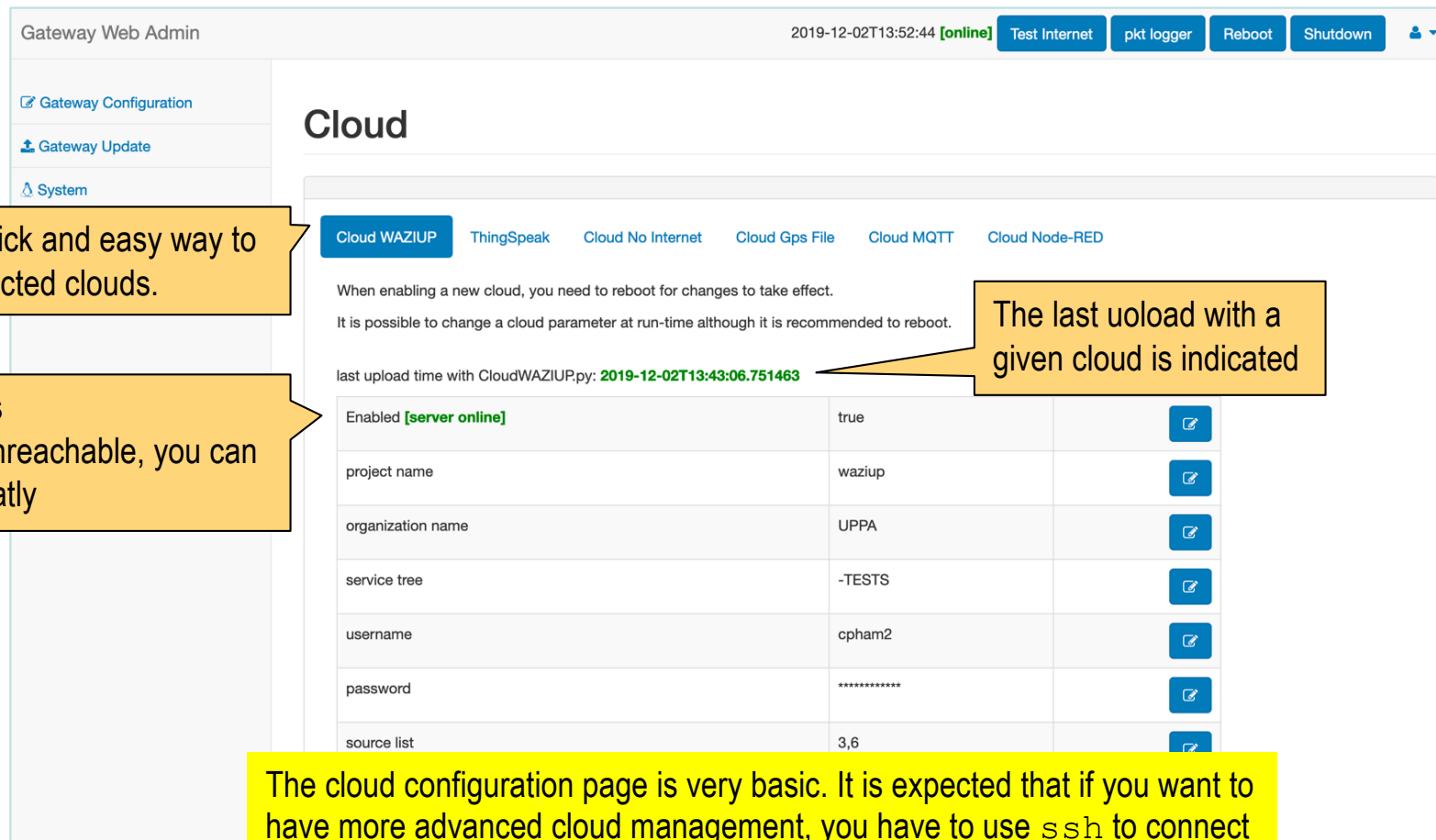
DOWNLOAD & INSTALL A FILE

- ❑ The **Download and install a file** option is a convenient way to install a configuration file
 - ❑ For instance, a customized `radio.makefile` file can be edited by an experienced user, then put on Dropbox and the link provided to an end-user (mail, SMS,...)
 - ❑ After installation, the end-user can use "Basic config" to recompile the gateway program and then reboot



The screenshot shows a web interface with a sidebar on the left labeled "System". The main content area has a top navigation bar with five tabs: "New Installation", "Full update", "Basic config", "Download and install a file" (which is highlighted with a blue background), and "Update web admin interface". Below the tabs, there is a section titled "URL of the file" with a text input field. Below the input field, there is a paragraph of text: "Enter a URL link to a file or .zip archive. A .zip archive will be decompressed and its content will overwrite existing files. All files will be downloaded to /home/pi/lor_gateway." followed by an example: "e.g. a Dropbox link like https://www.dropbox.com/s/83joc1e1xet114/gateway_conf.json". At the bottom of this section, there are two buttons: "Install" and "Clear".

□ Gateway cloud configuration section



Gateway Web Admin 2019-12-02T13:52:44 [online] Test Internet pkt logger Reboot Shutdown

Gateway Configuration Gateway Update System

Cloud

Cloud WAZIUP ThingSpeak Cloud No Internet Cloud Gps File Cloud MQTT Cloud Node-RED

When enabling a new cloud, you need to reboot for changes to take effect.
It is possible to change a cloud parameter at run-time although it is recommended to reboot.

last upload time with CloudWAZIUP.py: 2019-12-02T13:43:06.751463

Enabled [server online]	true	
project name	waziup	
organization name	UPPA	
service tree	-TESTS	
username	cpham2	
password	*****	
source list	3,6	

Provides a quick and easy way to configure selected clouds.

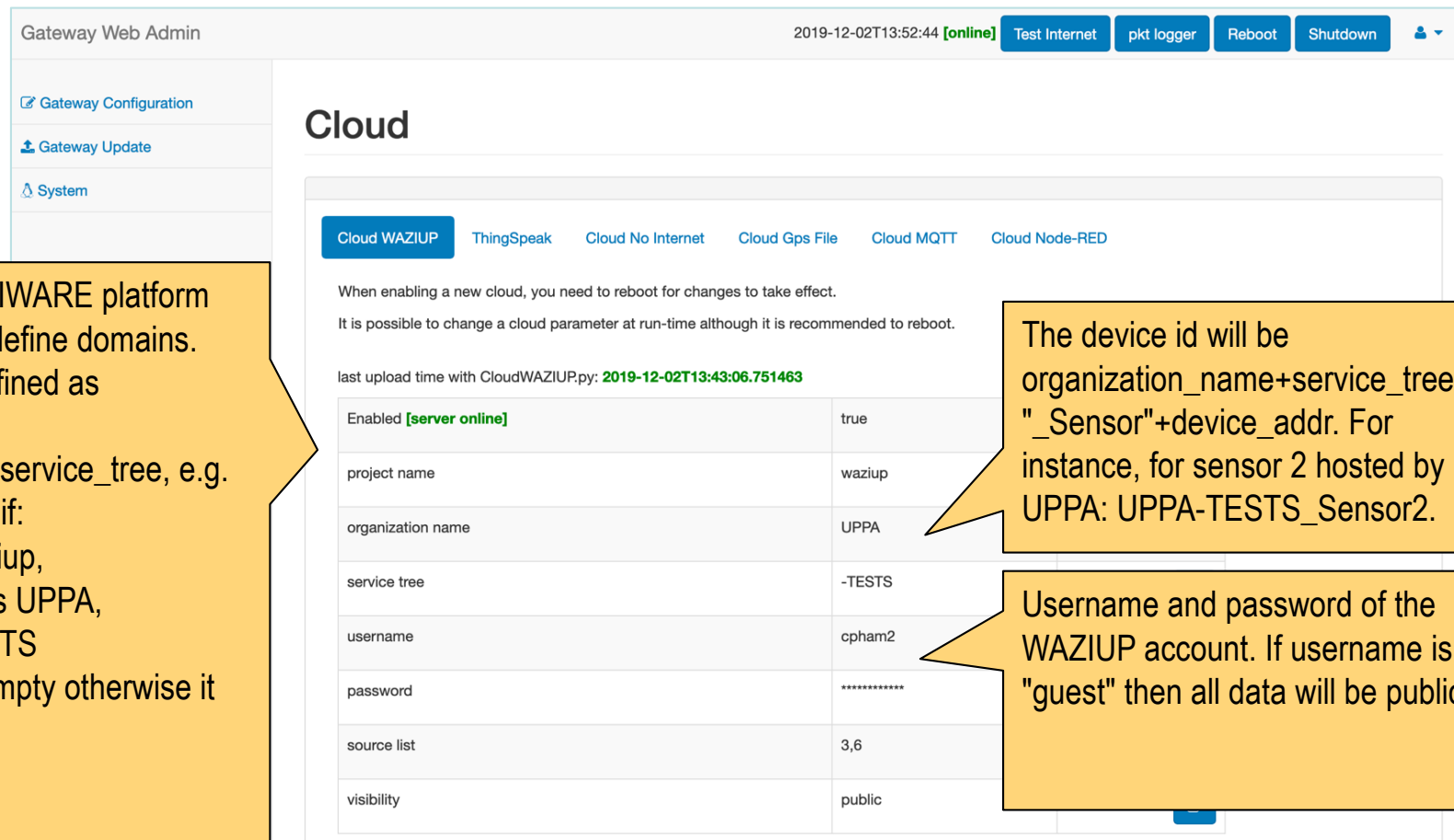
If the server is unavailable/unreachable, you can see it immediatly

The last uoload with a given cloud is indicated

The cloud configuration page is very basic. It is expected that if you want to have more advanced cloud management, you have to use `ssh` to connect to the gateway and configure it by editing the `clouds.json` file.

The WAZIUP cloud tab is only available when key_WAZIUP.py is found

□ Configuring WAZIUP cloud



Field	Value
Enabled	true [server online]
project name	waziup
organization name	UPPA
service tree	-TESTS
username	cpham2
password	*****
source list	3,6
visibility	public

WAZIUP cloud uses FIWARE platform with the possibility to define domains. The domain will be defined as project_name+'-'+organization_name+service_tree, e.g. waziup-UPPA-TESTS if:

- project_name is waziup,
- organization_name is UPPA,
- service_tree is -TESTS

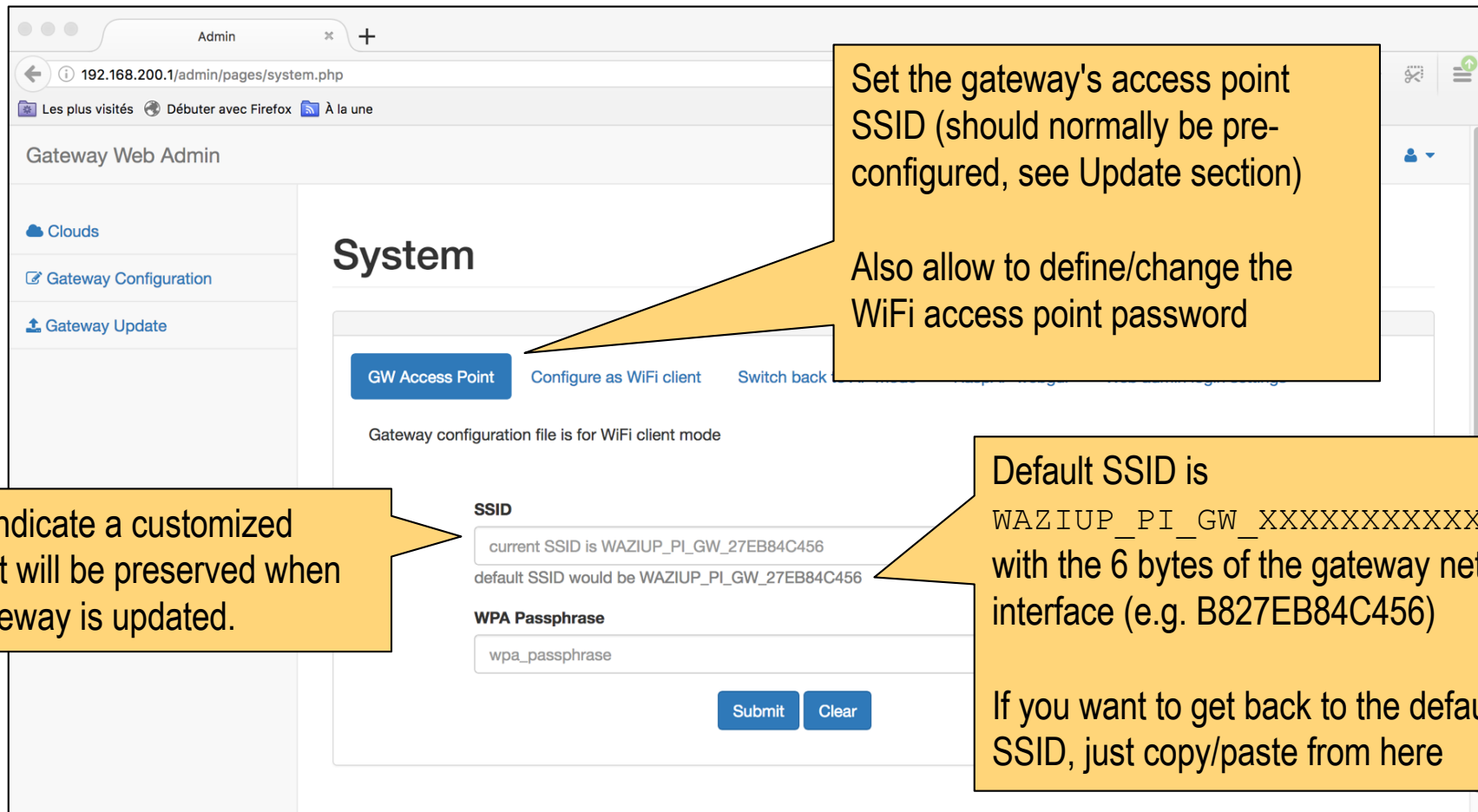
service_tree can be empty otherwise it must begin with a '-'.

The device id will be organization_name+service_tree+"_Sensor"+device_addr. For instance, for sensor 2 hosted by UPPA: UPPA-TESTS_Sensor2.

Username and password of the WAZIUP account. If username is "guest" then all data will be public

GATEWAY SYSTEM CONFIGURATION (1)

□ Gateway WiFi access point



The screenshot shows the 'System' configuration page in the 'Gateway Web Admin' interface. The page has a sidebar with 'Clouds', 'Gateway Configuration', and 'Gateway Update'. The main content area has tabs for 'GW Access Point' (selected), 'Configure as WiFi client', and 'Switch back'. Below the tabs, it states 'Gateway configuration file is for WiFi client mode'. There are two input fields: 'SSID' and 'WPA Passphrase'. The SSID field contains the text 'current SSID is WAZIUP_PI_GW_27EB84C456' and 'default SSID would be WAZIUP_PI_GW_27EB84C456'. The WPA Passphrase field contains 'wpa_passphrase'. At the bottom are 'Submit' and 'Clear' buttons.

Set the gateway's access point SSID (should normally be pre-configured, see Update section)

Also allow to define/change the WiFi access point password

Default SSID is
WAZIUP_PI_GW_XXXXXXXXXXXX
with the 6 bytes of the gateway network interface (e.g. B827EB84C456)

If you indicate a customized SSID, it will be preserved when the gateway is updated.

If you want to get back to the default SSID, just copy/paste from here

GATEWAY SYSTEM CONFIGURATION (2)

□ Configure as WiFi client

The screenshot shows the 'Gateway Web Admin' interface. The left sidebar contains links for 'Clouds', 'Gateway Configuration', and 'Gateway Update'. The main content area is titled 'System' and shows the 'Configure as WiFi client' tab selected. Below the tabs, it states 'Gateway configuration file is for WiFi client mode'. There are two input fields: 'SSID' with the placeholder 'your_wifi_network' and 'WPA Passphrase' with the placeholder 'your_wifi_network_password'. A red warning message is displayed between the fields: 'Warning: if a valid WiFi network is not configured you will not be able to connect through the gateway's access point anymore. If that happens, use wired Ethernet to switch back to access point mode. You MUST reboot after submitting the command.' At the bottom are 'Submit' and 'Clear' buttons. Two callout boxes provide additional instructions: one points to the 'Configure as WiFi client' button, and the other points to the warning message.

Admin 192.168.200.1/admin/pages/system.php

Gateway Web Admin

Clouds

Gateway Configuration

Gateway Update

System

GW Access Point **Configure as WiFi client** Switch back to AP mode RaspAP webgui Web admin login settings

Gateway configuration file is for WiFi client mode

SSID

your_wifi_network

Warning: if a valid WiFi network is not configured you will not be able to connect through the gateway's access point anymore. If that happens, use wired Ethernet to switch back to access point mode. You MUST reboot after submitting the command.

WPA Passphrase

your_wifi_network_password

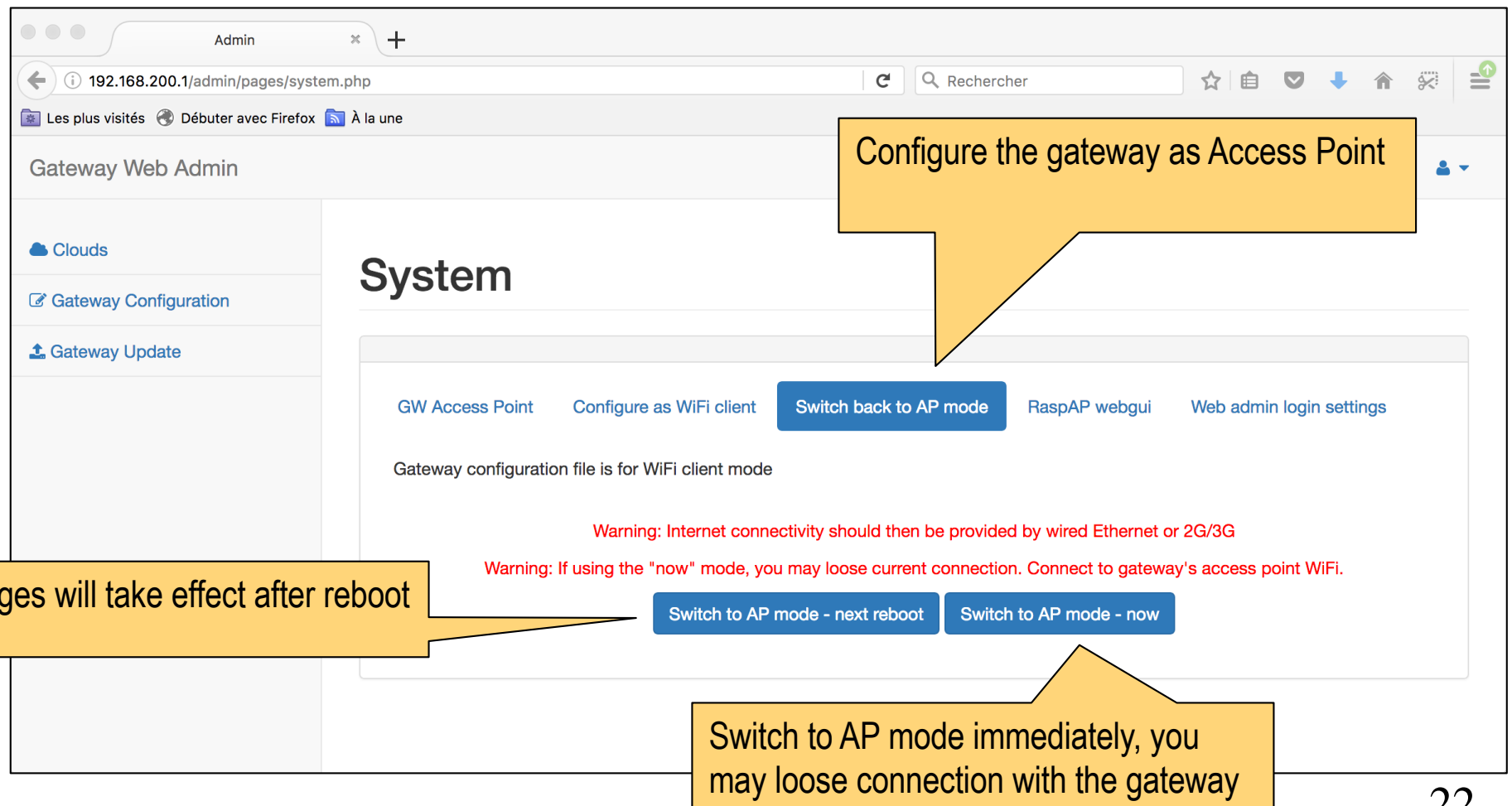
Submit Clear

Configure the gateway as WiFi client to connect to an existing WiFi network. Changes will take effect after reboot.

Warning: if a valid WiFi network is not configured you will not be able to connect through the gateway's access point anymore. If that happens, use wired Ethernet to switch back to access point mode.

GATEWAY SYSTEM CONFIGURATION (3)

□ Configure as WiFi Access Point



Admin

192.168.200.1/admin/pages/system.php

Rechercher

Gateway Web Admin

Clouds

Gateway Configuration

Gateway Update

System

GW Access Point Configure as WiFi client **Switch back to AP mode** RaspAP webgui Web admin login settings

Gateway configuration file is for WiFi client mode

Warning: Internet connectivity should then be provided by wired Ethernet or 2G/3G

Warning: If using the "now" mode, you may loose current connection. Connect to gateway's access point WiFi.

Switch to AP mode - next reboot **Switch to AP mode - now**

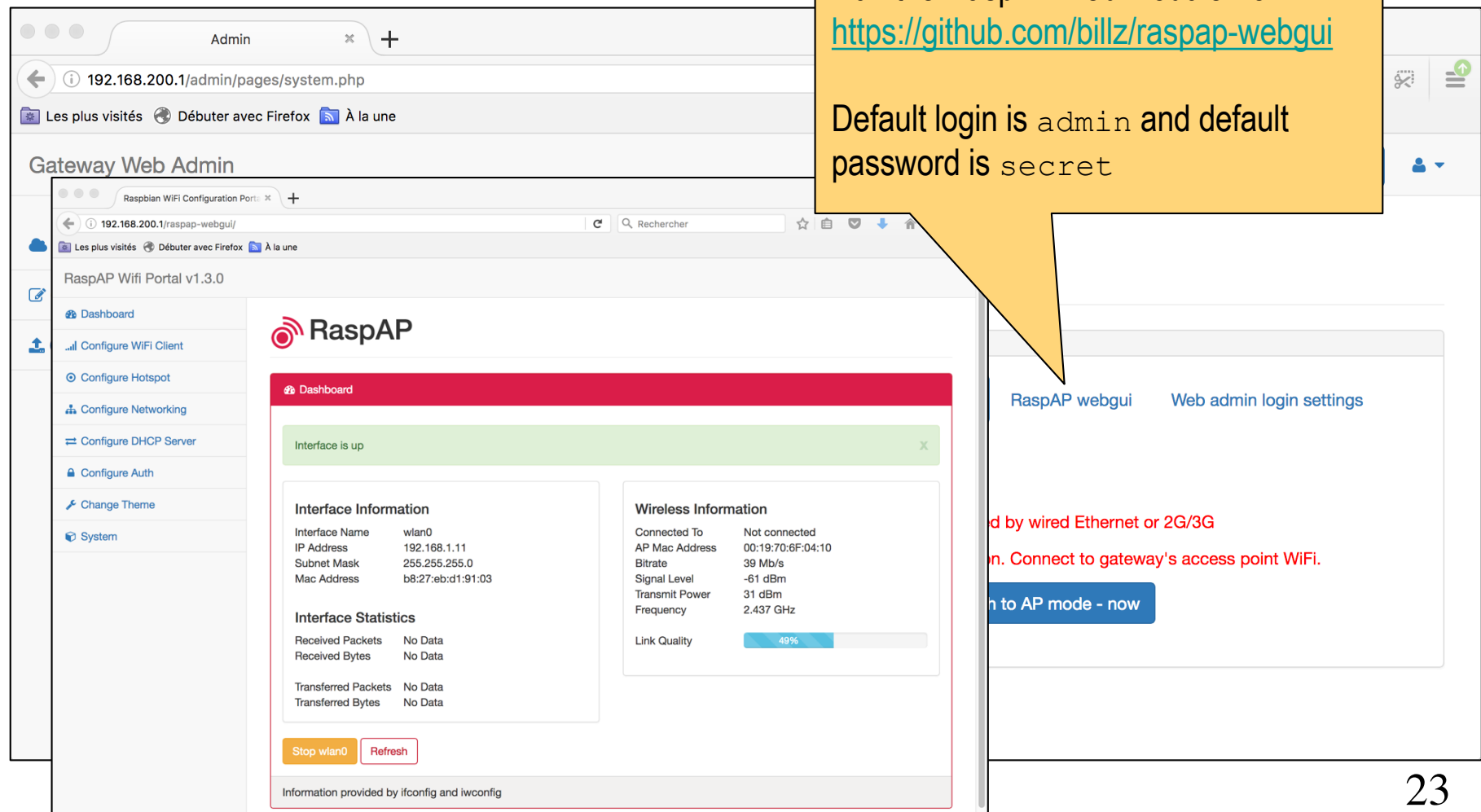
Configure the gateway as Access Point

Changes will take effect after reboot

Switch to AP mode immediately, you may loose connection with the gateway

GATEWAY SYSTEM CONFIGURATION (4)

□ Run the RaspAP module



The screenshot shows two browser windows. The background window is the 'Gateway Web Admin' at 192.168.200.1/admin/pages/system.php. The foreground window is the 'RaspAP Wifi Portal v1.3.0' at 192.168.200.1/raspap-webgui/. The RaspAP dashboard displays the following information:

Interface Information	
Interface Name	wlan0
IP Address	192.168.1.11
Subnet Mask	255.255.255.0
Mac Address	b8:27:eb:d1:91:03

Wireless Information	
Connected To	Not connected
AP Mac Address	00:19:70:6F:04:10
Bitrate	39 Mb/s
Signal Level	-61 dBm
Transmit Power	31 dBm
Frequency	2.437 GHz
Link Quality	49%

Interface Statistics:

Received Packets	No Data
Received Bytes	No Data
Transferred Packets	No Data
Transferred Bytes	No Data

Buttons: Stop wlan0, Refresh

Information provided by ifconfig and iwconfig

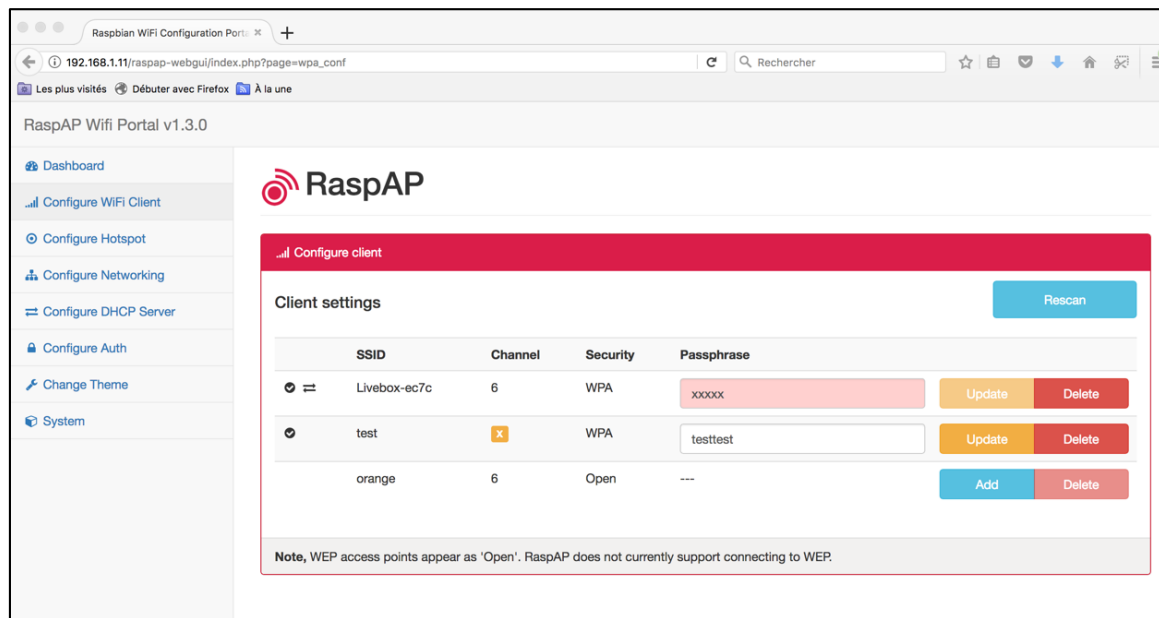
Yellow callout box: Run the RaspAP web module from <https://github.com/billz/raspap-webgui>
Default login is admin and default password is secret

Red text: d by wired Ethernet or 2G/3G
n. Connect to gateway's access point WiFi.

Blue button: n to AP mode - now

GATEWAY SYSTEM CONFIGURATION (5)

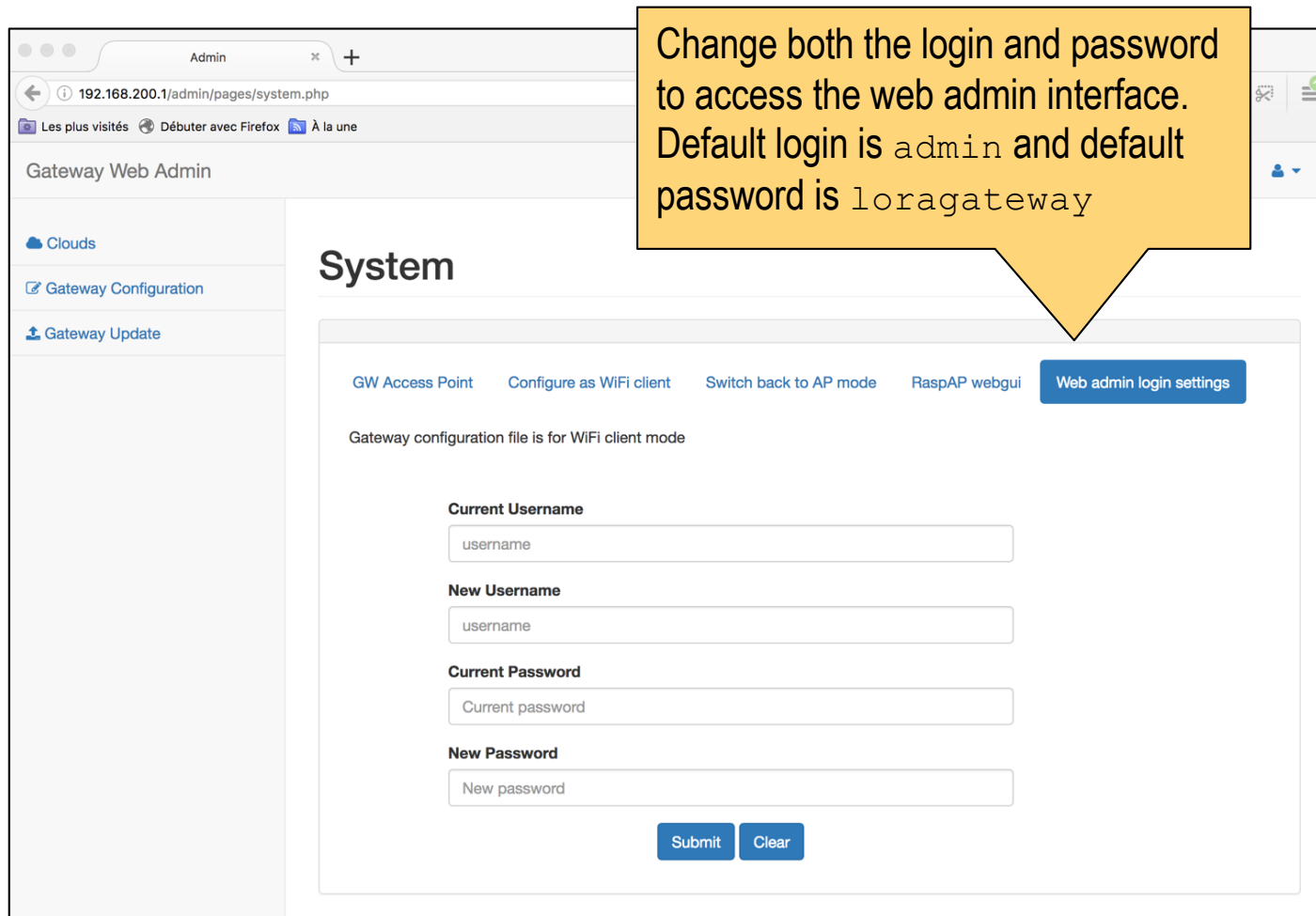
- ❑ RaspAP can configure some networking functions. It can be useful for dynamically select WiFi networks



- ❑ However, it is recommended to use our web admin interface to control WiFi client <-> Access Mode feature

GATEWAY SYSTEM CONFIGURATION (6)

□ Configure auth for web admin interface



Change both the login and password to access the web admin interface. Default login is `admin` and default password is `loragateway`