MikroTik

CERTIFIED TRAINER

web portal for basic router config using tr069 and genieacs

WE INSPIRE KNOWLEDGE

Lisbon
20 de Setembro

Who am I?

I'm Jorge Castellet

I'm a Mikrotik Certified Trainer

MTCNA, MTCIPv6E, MTCRE, MTCTCE, MTCWE,MTCUME, MTCINE, MTCSE

I'm freelance

j.castellet@yatuaprendes.com

Fazemos cursos e certificamos em Mikrotik com nossos parceiros da **Truenet.**

Basically we need

- **C**PE **W**an **M**anagement **P**rotocol
- **A**uto **C**onfiguration **S**erver

CWMP

- TR-069 (Technical Report 069).
- Developed for the automatic management and configuration of the devices.

CWMP

- Based on SOAP / HTTP.
- Secure self-configuration.
- Functions for management control.
- Integrated environment.

CWMP

- A Session is a message exchange.
- The CPE starts a Session in response to different events.
- Only CPE starts a Session

CWMP

- The ACS may request a Session.
- Execute RPC’s
- CPE always stars a Session with an “Inform” RPC.

Mikrotik TR-069

- Supports HTTP and HTTPS.
- HTTP authentication.
- Inform.
- Client certificates.
- Data Mode based on the **TR-181 Issue2 Amendment 11.**

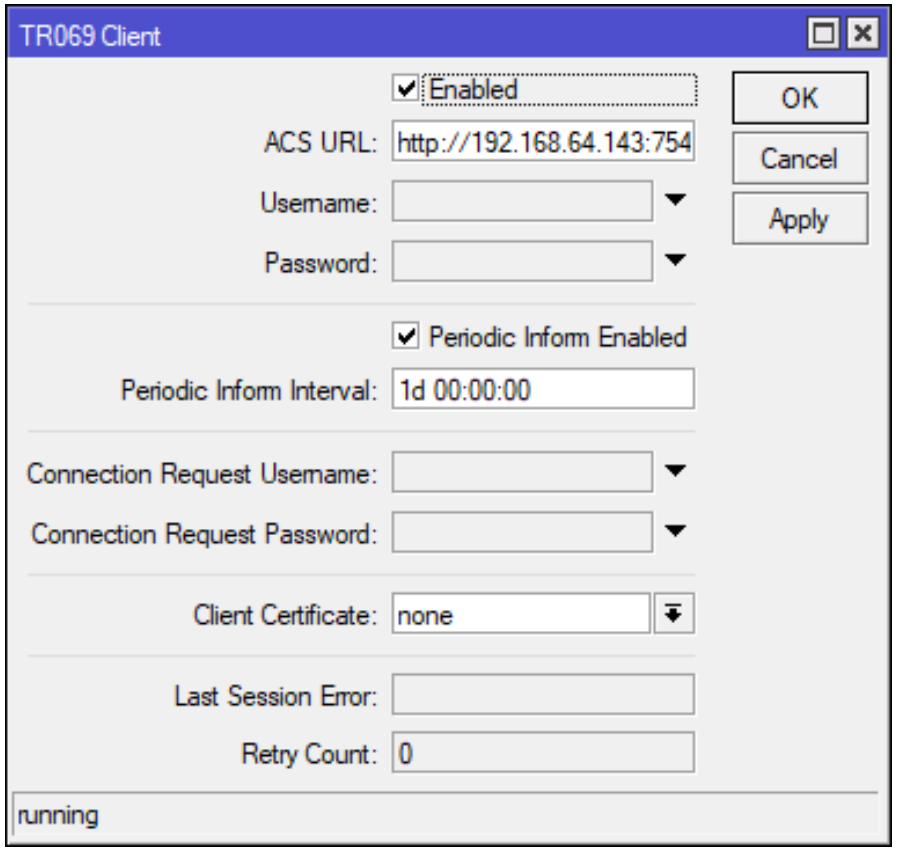
I’m sad

After reading the TR-181 and check the mikrotik wiki….

- **NOT ALL CONFIGURATION OPTIONS ARE AVAILABLE THROUGH TR-069**.
  - We need to use scripting for some options, such as channel width.

Mikrotik TR-069

Minimum configuration:



Mikrotik TR-069

- Unfortunately, after a reset, the configuration of the TR-069 is lost.

  (and with that, all of our dreams)

- We have to use netinstall.

We have an example script in the wiki:
http://wiki.mikrotik.com/wiki/Tr069-best-practices

GenieACS

- Fast and Light Autoconfiguration System.
- Open source.
- TR-069 solution for remote management and provisioning.
- Built on Node.js and MongoDB.

API

- GenieACS provides a powerfull API.
- The API is supported by geniacs-nbi.

- I use this API for:
  - ✓Check the client status.
  - ✓Send commands to a client.

Customer Portal

- I want customers to be able to change the basic parameters of their WiFi.
- The customer only can access from their place.
- The client only knows the IP of his router: 192.168.88.1.
- As this is very difficult to remember .. I'll use the name "config.me"
  - http://config.me

Previous work.

- To make things flow smoothly, we need to configure our mikoritk.
- I need to:
  - ✓Add a dns static entry with config.me pointing to 192.168.88.1
  - ✓A firewall dstnat rule redirecting the http://192.168.88.1 to our web server http://172.16.100.33.

Customer portal

- Client Authentication Page
  - ➢Simple authentication.
  - ➢For sure is not secure 100%.
- Router Status Page.
- Wifi Parameters Edit Page.
  - ✓Enable/disable interface.
  - ✓Channel.
  - ✓Protocol.
  - ✓SSID.
  - ✓Password.

Customer Portal

- I made it in Express.js
  - I'm not a senior programmer in Nodejs, so keep it in mind.

Customer Portal

- GenieACS stores in MongoDB a copy of the parameters send by the CPE in the Inform Message.
- We query the genieacs database through the api.
- Genieacs is the only one who query the CPE through cwmp.

- Then … we need to send a Refresh RPC to genieacs in order to obtain the latest parameters and to know if the CPE is still alive.

Data

- We expect the data in genieacs-gui format

```
Device.IP
Device.IP.Interface
Device.IP.Interface.1
Device.IP.Interface.1.IPv4Address
Device.IP.Interface.1.IPv4Address.3
Device.IP.Interface.1.IPv4Address.3.Enable true
Device.IP.Interface.1.IPv4Address.3.Status Enabled
Device.IP.Interface.1.IPv4Address.3.IPAddress 192.168.88.73
Device.IP.Interface.1.IPv4Address.3.SubnetMask 255.255.255.0
```

Data

- But instead we have an object

```
{ _timestamp: '2019-09-20T09:27:53.175Z',
  IPv4Address:
   { '4':
      { _timestamp: '2019-09-20T09:27:53.175Z',
        _object: true,
        _writable: true,
        Enable: [Object],
        Status: [Object],
```

Data

- And to our misfortune, the references are in the genieacs-gui format

```
Device.IP.Interface.1.IPv4Address.3.IPAddress 192.168.88.73
Device.IP.Interface.1.IPv4Address.3.SubnetMask 255.255.255.0
Device.IP.Interface.1.Enable true
Device.IP.Interface.1.Status Up
Device.IP.Interface.1.LowerLayers Device.Ethernet.Link.1
```

Data

- The getvalue function comes to help us

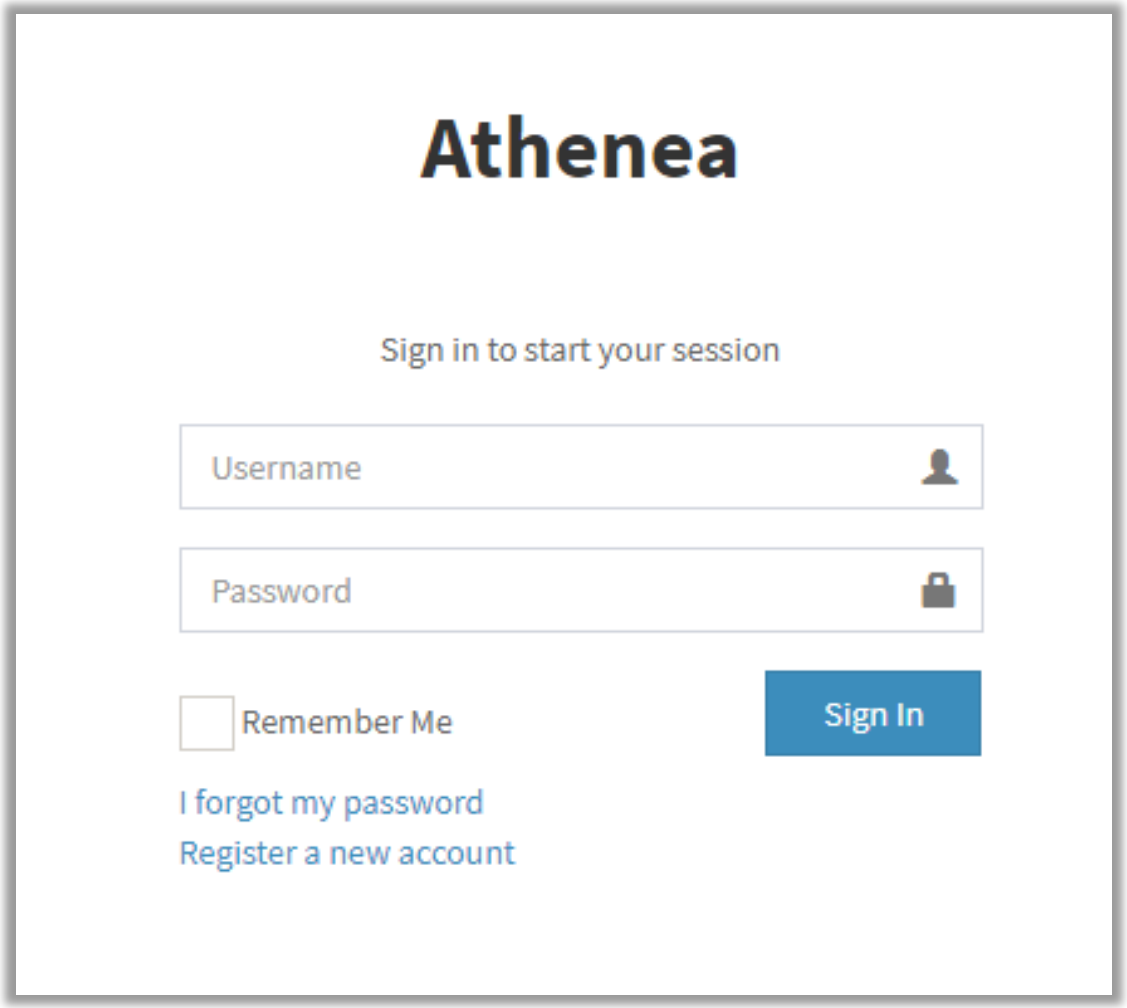
```
exports.getvalue= function(obj,x) {
    x.split(".").forEach(function(v) {
      if (isNaN(v))
       obj=eval('obj.'+v);
      else
       obj=eval('obj['+v+']');
    });
    return obj;
}
```

Data

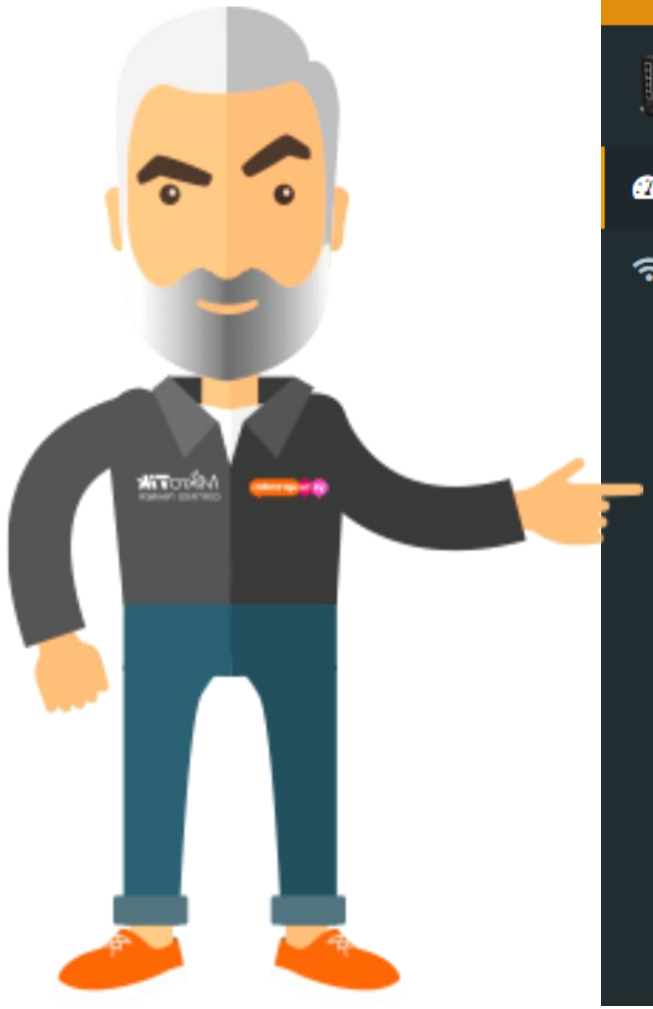
```
// Looking for the IP assgindd to ether1
   ifstack=misc.getvalue(obj,"Device.InterfaceStack");
   tosearch='';
   for (let [key, value] of Object.entries(ifstack)) {
      if (typeof(value)!= 'object')
        continue;
      if (value.LowerLayer._value=='Device.Ethernet.Interface.1')
        tosearch=value.HigherLayer._value;
   };
```

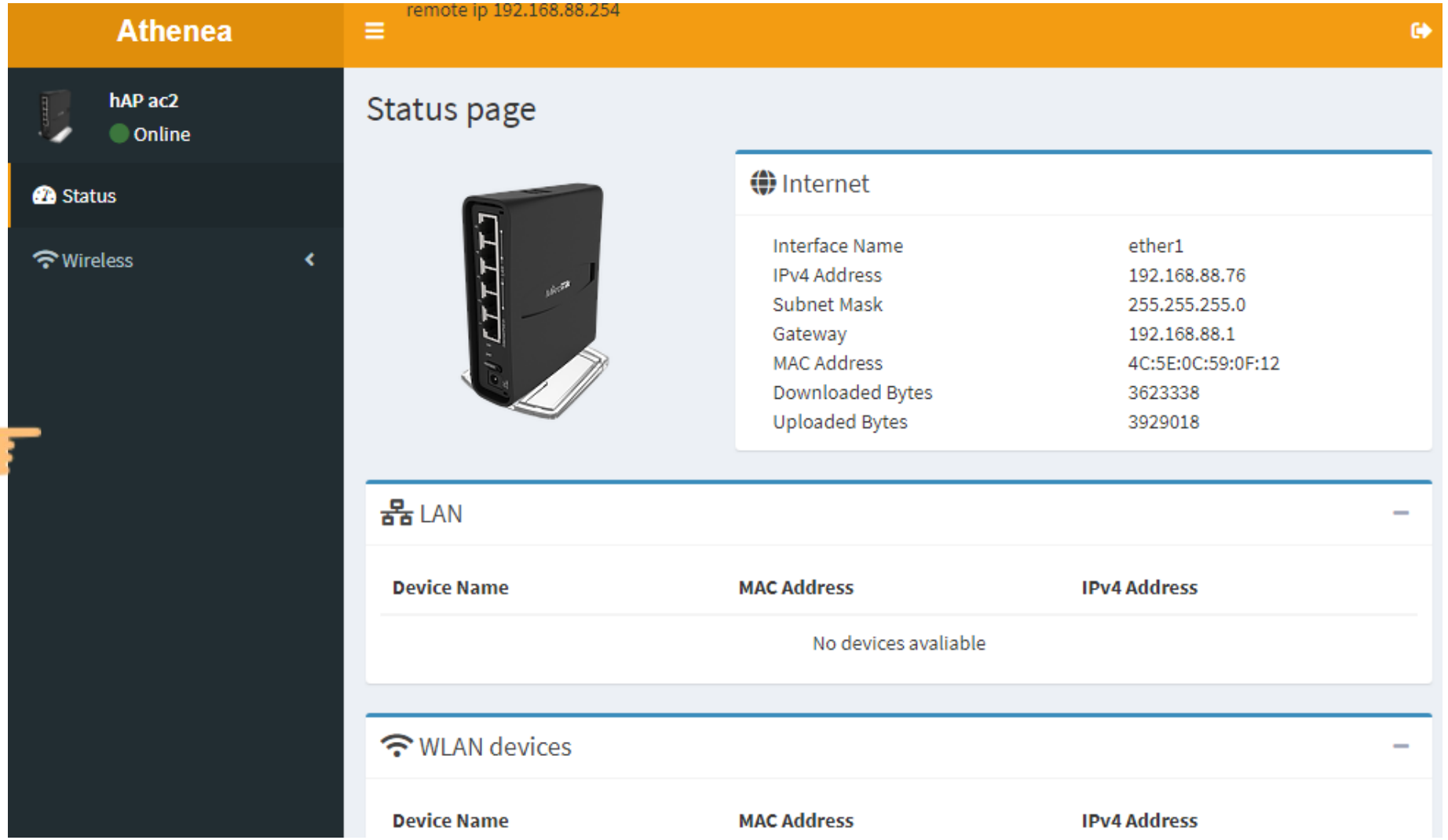
Login Page


ya tu aprendes
MikroTik
CERTIFIED TRAINER

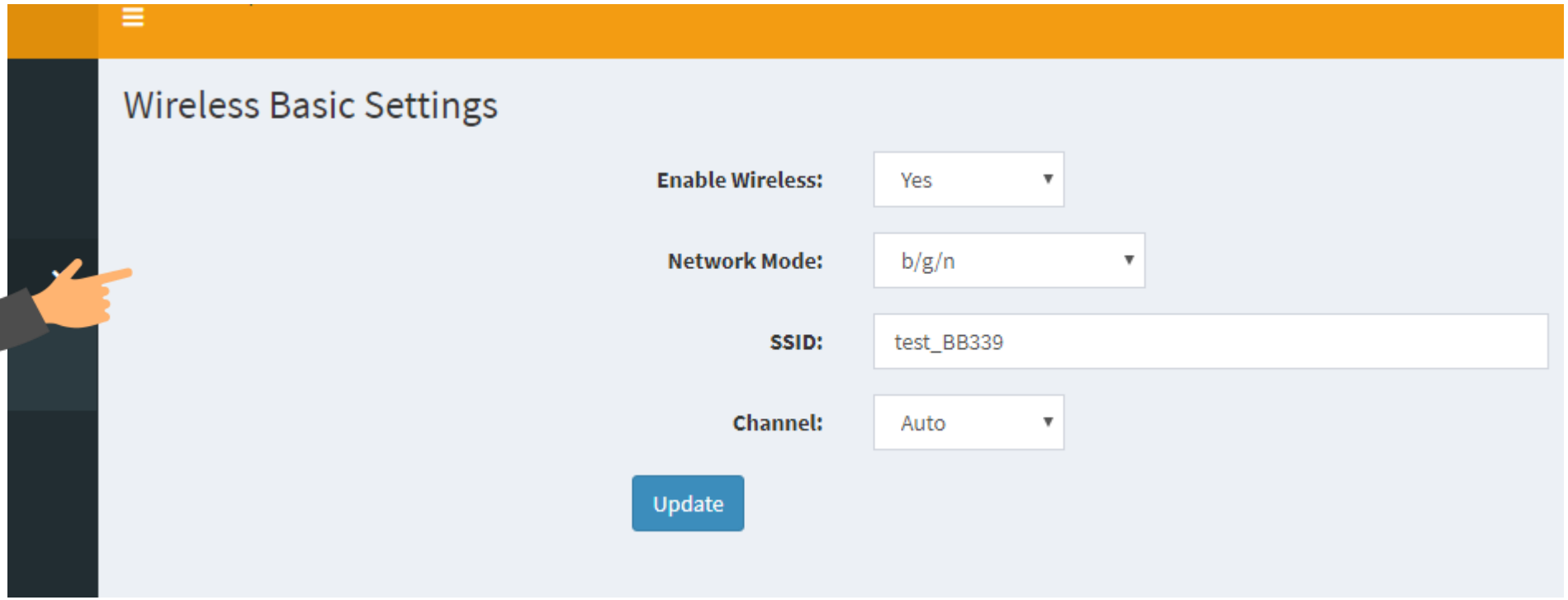

Athenea
Sign in to start your session
Username
Password
Remember Me
Sign In
I forgot my password
Register a new account

Status Page

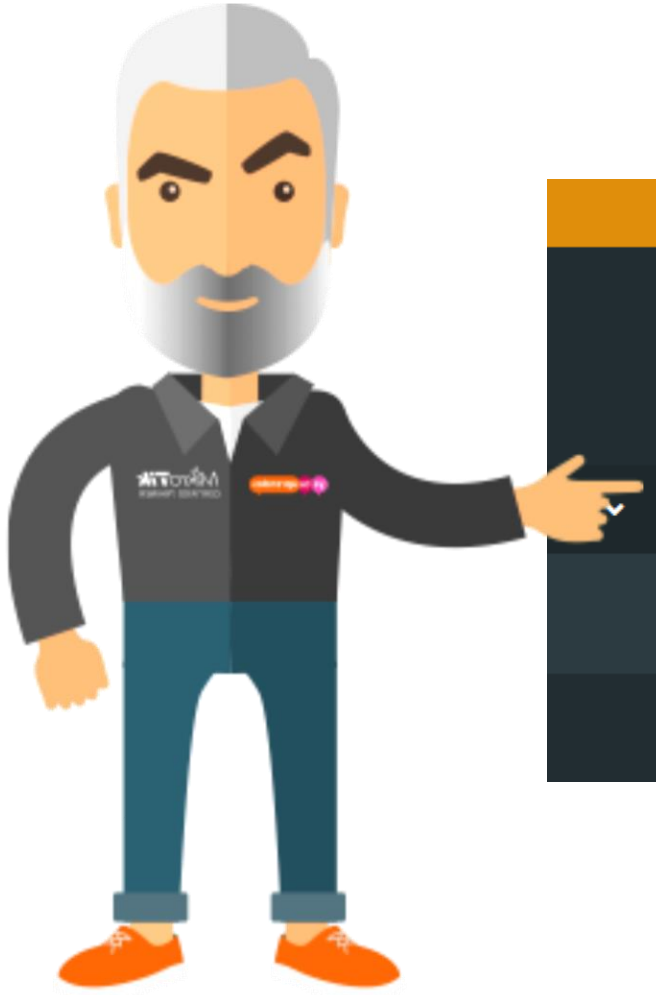


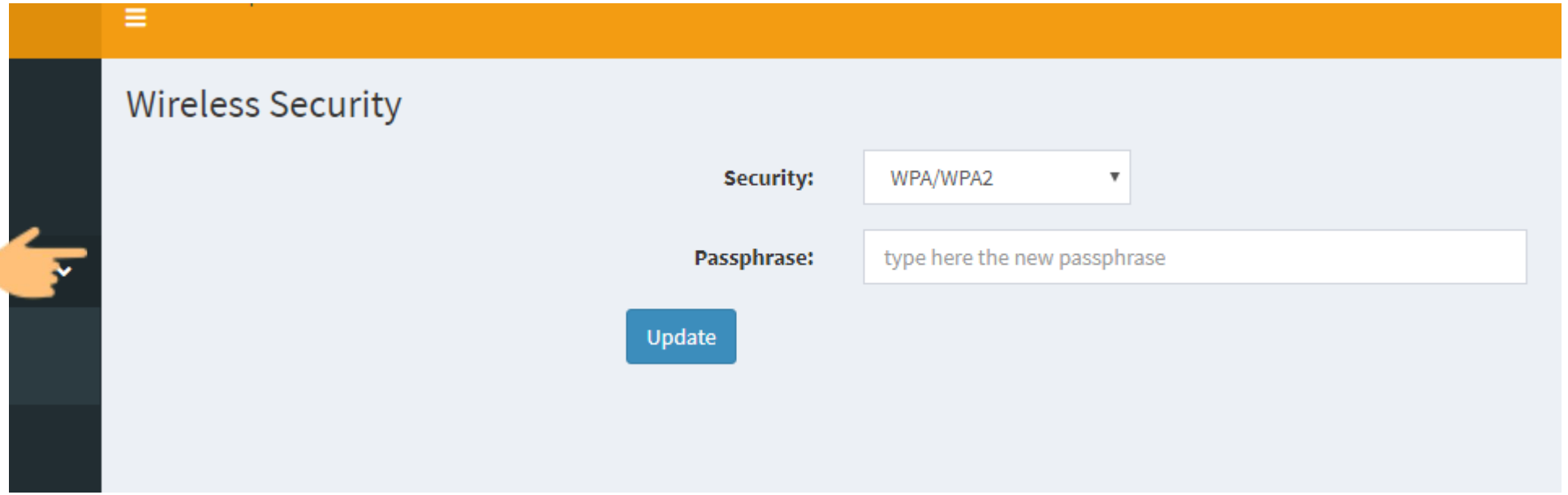

Athenea
remote ip 192.168.88.254
hAP ac2
Online
Status
Wireless
Status page
Internet
Interface Name ether1
IPv4 Address 192.168.88.76
Subnet Mask 255.255.255.0
Gateway 192.168.88.1
MAC Address 4C:5E:0C:59:0F:12
Downloaded Bytes 3623338
Uploaded Bytes 3929018
LAN
Device Name
MAC Address
IPv4 Address
No devices avaliable
WLAN devices
Device Name
MAC Address
IPv4 Address

Wireles. Basic Settings



Wireless. Security





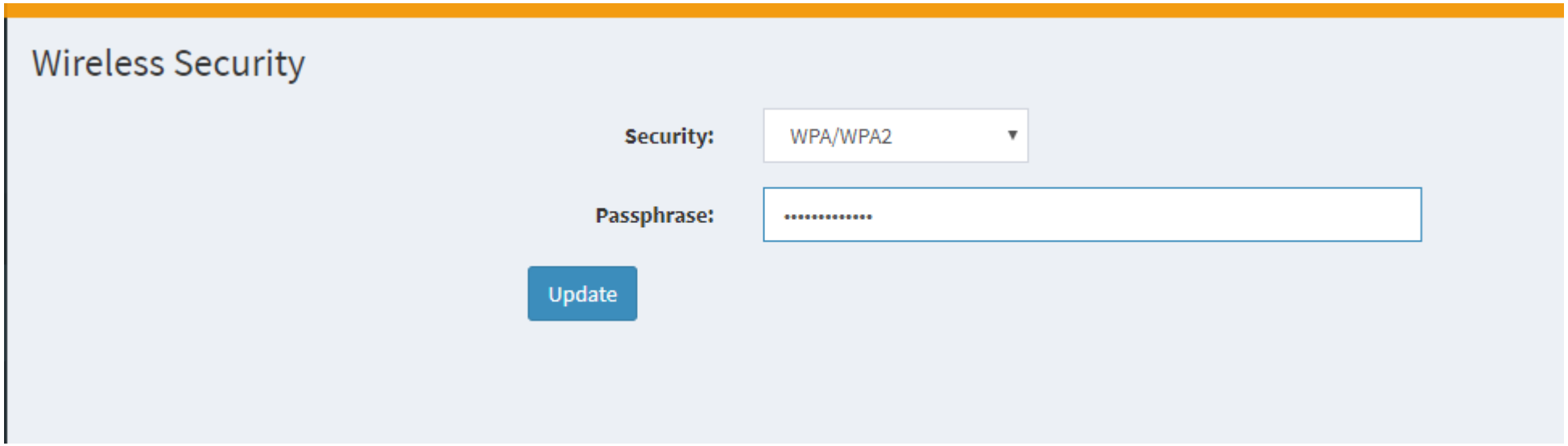
Example – Change wifi password

Wireless Tables

WiFi Interfaces | W60G Station | Nstreme Dual | Access List | Registration | Connect List | Security Profiles | Channels

Name	Mode	Authenticatio...	Unicast Ciphers	Group Ciphers	WPA Pre-Shared ...	WPA2 Pre-Shared...
* default	none					
profile1	dynamic keys	WPA PSK	aes ccm	aes ccm	testingloop	pruebaprueba

Example – Change wifi password



The new passphrase is **LisbonMUM2019**

Example – Change wifi password

Wireless Tables

WiFi Interfaces | W60G Station | Nstreme Dual | Access List | Registration | Connect List | Security Profiles | Channels

Name	Mode	Authentication Types	Unicast Ciphers	Group Ciphers	WPA Pre-Shared ...	WPA2 Pre-Shared...
;;; [tr069 auto created]						
ap-security-0	dynamic keys	WPA PSK WPA2 PSK	aes ccm	aes ccm	LisbonMUM2019	LisbonMUM2019
* default	none					
profile1	dynamic keys	WPA PSK	aes ccm	aes ccm	testingloop	pruebaprueba

Test passed !!

If you want to obtain a copy of the virtual machine that I used in this presentation,

Please, send an email to:

j.castellet@yatuaprendes.com

And we will send you a download link.

Thank you for your attention.