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# MUM BULGARIA

SOFIA, June 4<sup>th</sup>, 2019

# HOW WE BUILD AN ISP USING MIKROTIK, ONLY!

— STARNET shpk WISP —

# CONTENT:

- STARNET business profile
- Professional profile of myself
- How everything started
- How we got to know MikroTik
- Actual structure of Network  
(CPE / Tower infrastructure / Backbone and Core)
- General configurations based on Mikrotik  
and made for MikroTik Hardware and Software
- Projects based on MikroTik
- Training and MikroTik Academy



# Who is Who

- **Initially STARSAT since 2003**
- **STARNET started January 2014**
- **17 year in telecommunication field**
- **7 years providing wireless services as WISP**
- **Registered in RIPE with AS 60304**
- **20 people offering services in 5 different areas**

# OUR PARTNERS

MikroTik  
routerboard

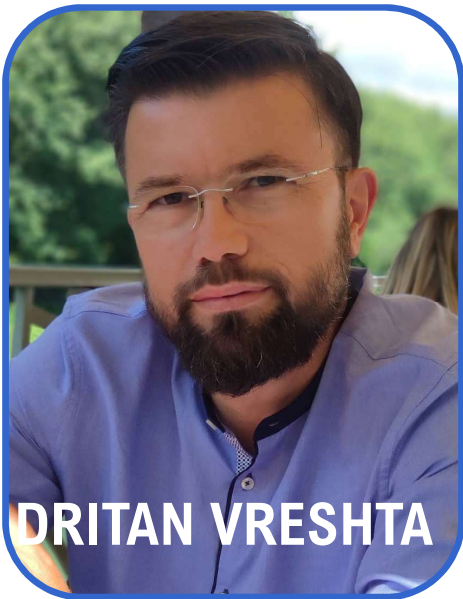
SPLYNX

HS NETWORK  
MANAGER

OPEN-SKY™  
INTERNET VIA SATELLITE

RF®  
ELEMENTS

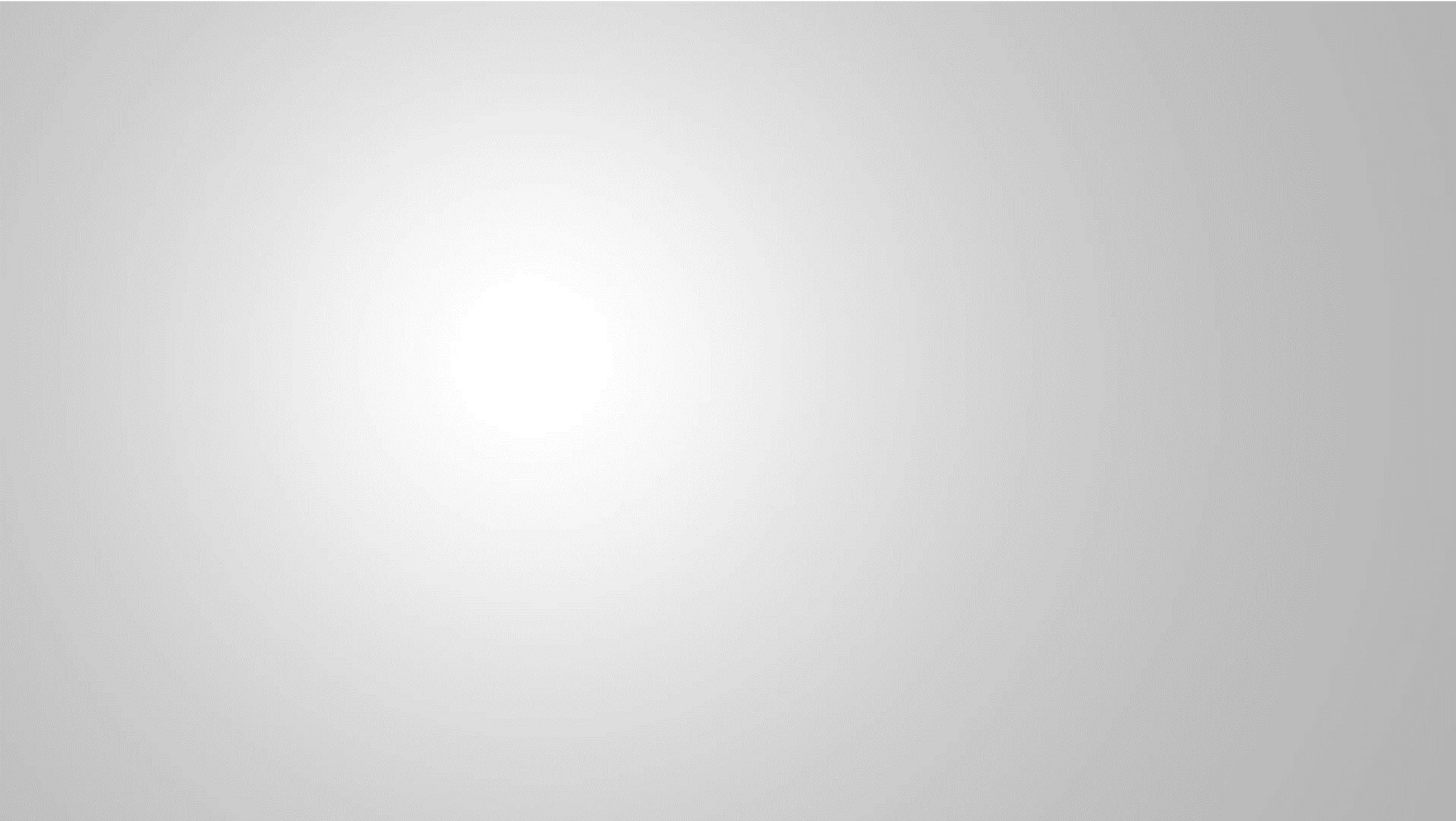
# PROFESSIONAL PROFILE



- **Studied Mathematics in University of Tirana**
- **Involved in telecommunication business since 2000**
- **Funder and CEO of:**  
*STARSAT since 2003    STARNET since 2014*
- **MikroTik Certification**  
*MTCNA / MTCRE / MTCTCE / MTCINE*
- **Academy Trainer**

# HOW EVERYTHING STARTED

- **Initially STARSAT since 2003**
- **Detailed analyze of the market**
- **Why we choose to work with MikroTik**
- **Started working with two RB 1200**
- **First MIKROTIK MUM**





# SOME ELEMENTS THAT WORKED FOR US



- **Initial ideas not always can be financed well**
- **Find a real need that you will address and solve, in our case internet penetration in rural areas**
- **As soon as possible we have to generate profit**
- **Focus on a Target Group**
- **“Keep it Simple” and get detailed on optimizations**

# COVERAGE AND GENERAL DATA

- **Almost 100% of our equipments are MikroTik Router Board**
- **About 5000 devices are actually online in our network**
- **About 3000 CPE are installed in customer side not including the indoor routers and AP**
- **More than 1000 equipment in Backbone and Towers**



# CUSTOMER PREMISES EQUIPMENT

- **There are a lot of choices to address all kind of installations**
- **The most used**
- **General configurations**
- **Suggestions and best practices**
- **Monitoring and scripts**



# GENERAL CONFIGURATIONS

- **PPPoE client**
- **NV2 protocol**
- **Very careful on frequency selection and quality of signal**

# MONITORING AND SCRIPTS

- **Active monitoring with DUDE server of...MikroTik**
- **Scripts are applied for configuration and reporting**

# TOWER INFRASTRUCTURE

- **Stability of tower equipment**
- **Routers used and best experiences**
- **AP configuration and best practices**
- **Frequency management and conformity**

# ACCESS POINTS AND TOWERS



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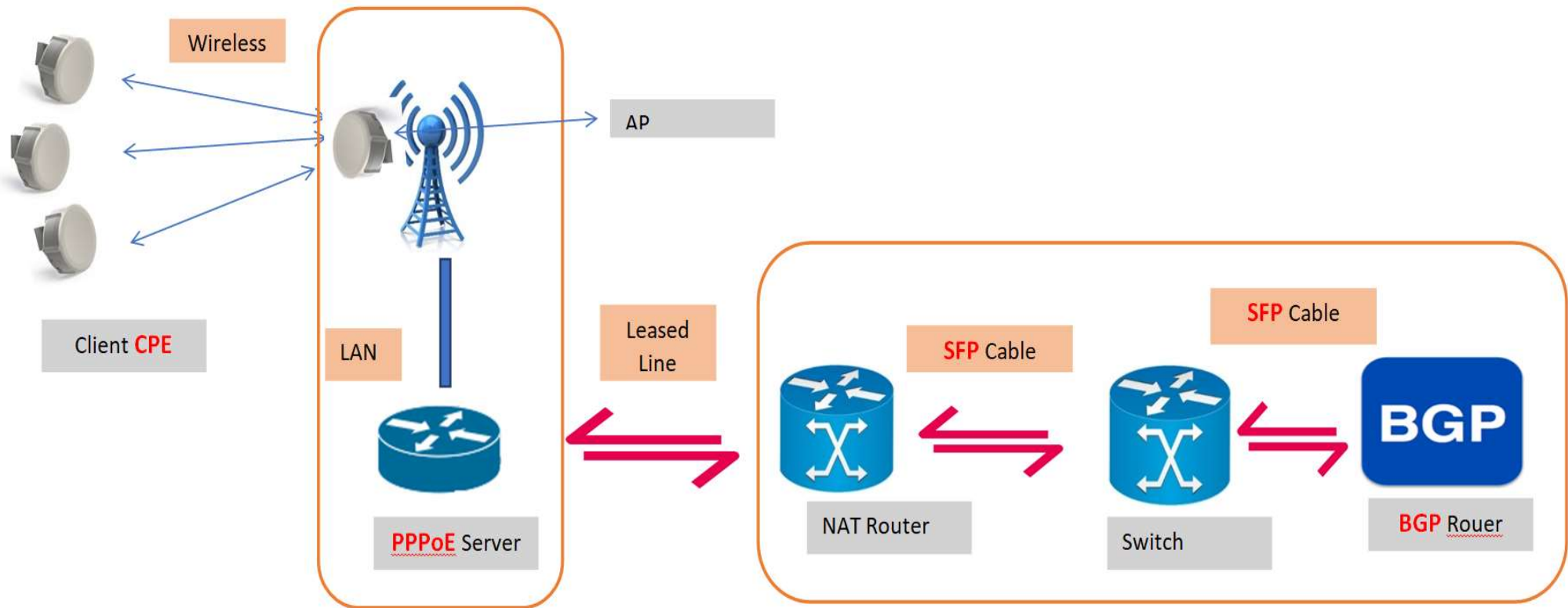
# BACKBONE AND CORE

- **MikroTik SFP**
- **Examples of interfacing with different Operators**
- **BGP configuration (*3 major operators and 1 IXP*)**
- **MikroTik Switches**

# GENERAL CONFIGURATIONS

- **General schematic**
- **Why we have choose PPPoE**
- **Billing**

# SCHEMATIC OF EXISTING NETWORK



# Why PPPoE?

- **What is PPPoE protocol**
- **Characteristics**
- **Control of sessions**
- **Simplicity on IP configurations**
- **Simple configuration on customer side with username and password**

# BILLING

- **Experience with Free Radius and Radius Manager**
- **Actual situation with integrated billing “Made for MikroTik”**

# ANOTHER “MADE FOR MIKROTIK” SOFTWARE



The screenshot shows the starnet dashboard interface. At the top left is the starnet logo with the tagline "ONLINE. SMART. SUPPORTED.". The top right corner contains navigation icons and the user name "dritanvreshta". A left sidebar menu lists various sections: Dashboard, Tariff plans, Customers, Finance, Inventory, Networking, Support, Voice, Administration, Config, My Profile, and Logout. The main content area is titled "Dashboard" and includes a welcome message for "Dritan Vreshta". It features four key performance indicator (KPI) cards: "Online customers!" with a value of 2808, "New Customers!" with a value of 0, "New & Open tickets!" with a value of 0, and "Devices down!" with a value of 1. Below these are two detailed sections: "System status" and "Customers".

**System status**

CPU Cores	8
Load average (1,5,15 min)	0.34, 0.73, 0.6
CPU usage	0.13 %
Memory: 15.55 GB (Free 82.4 %)	Used Free
I/O Wait	1.75 %
Swap: 977 MB (Free 100 %)	Free
Disk: 1.79 TB (Free 93.75 %)	Free
Last DB backup	about 3 hours ago (16.84 MB)
Last Remote Backup	33 minutes ago

**Customers**

Customers total	3670
New	0
Active	2913
Blocked	69
Doesn't use services	688
Added last month	97
Added last year	1271

# PROJECT BASED ON MIKROTIK

- **Hotspot Networks**
- **Configuration examples**
- **VPN concentrator for satellite networks**
- **Network integration with other operators**
- **Use of MikroTik in FTTH projects**



# WELCOME PORTAL AND LOGIN MENU

## (SUMMER WIFI PROJECT)



Vodafone WiFi

### Internet i shpejtë dhe i sigurtë

Dergo **SMS falas** me tekst **WiFi** tek **50222** dhe vendos numrin e telefonit dhe fjalëkalimin që do të merrni përkatësisht me poshtë.

Power to you

#### Identifikohu

Numri i telefonit (003556xxxxxxx)

admin

Duke dërguar SMS më sipër ju bini dakort me kushtet dhe afatet e Vodafone WiFi.

Fjalëkalimi [Harruat fjalëkalimin?](#)

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Pranoj [Termat dhe Kushtet](#)

Lidhu

Klient jo Vodafone?  
Identifikohu me Facebook



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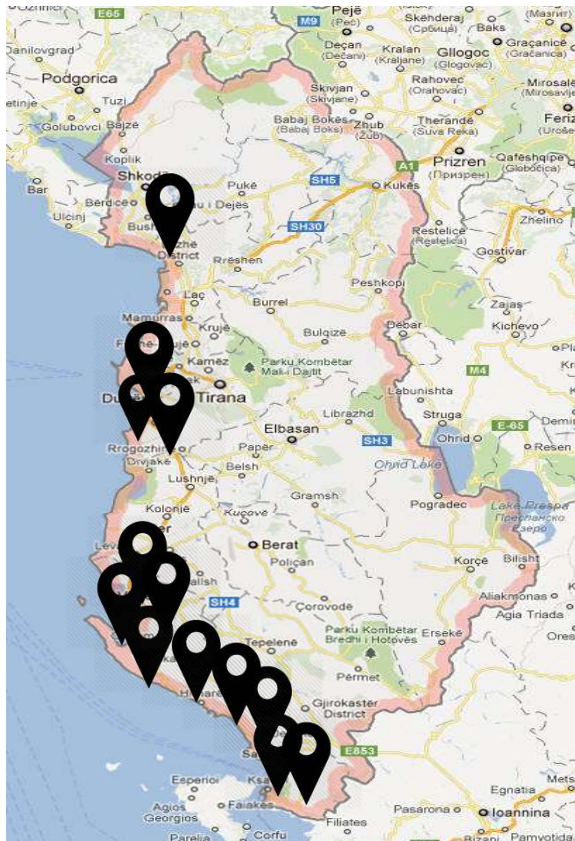
Lidhu

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# MAP AND USED HARDWARE

## (SUMMER WIFI PROJECT)



**AP:** SXT 2.4 GHz

**Routerboard RB850Gx2**

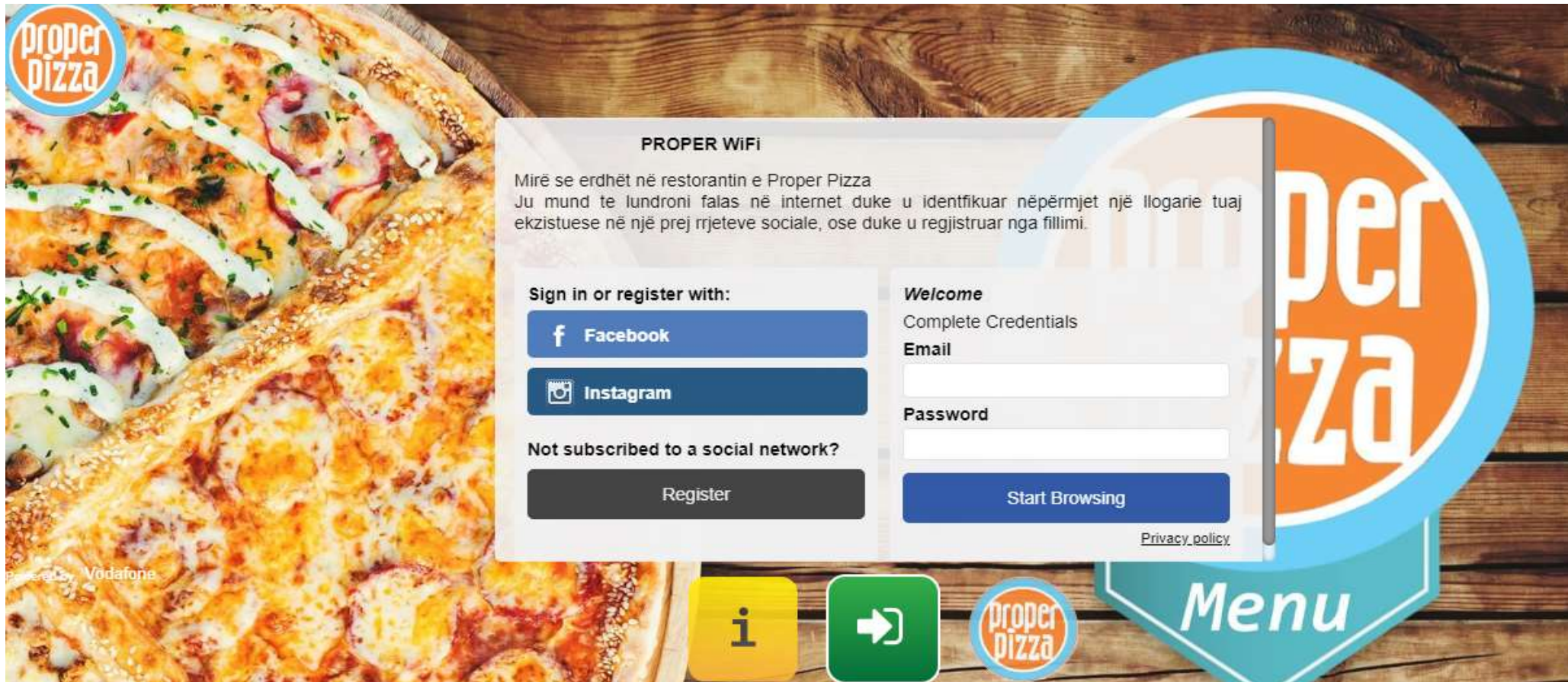
# ANOTHER “MADE FOR MIKROTIK” SOFTWARE



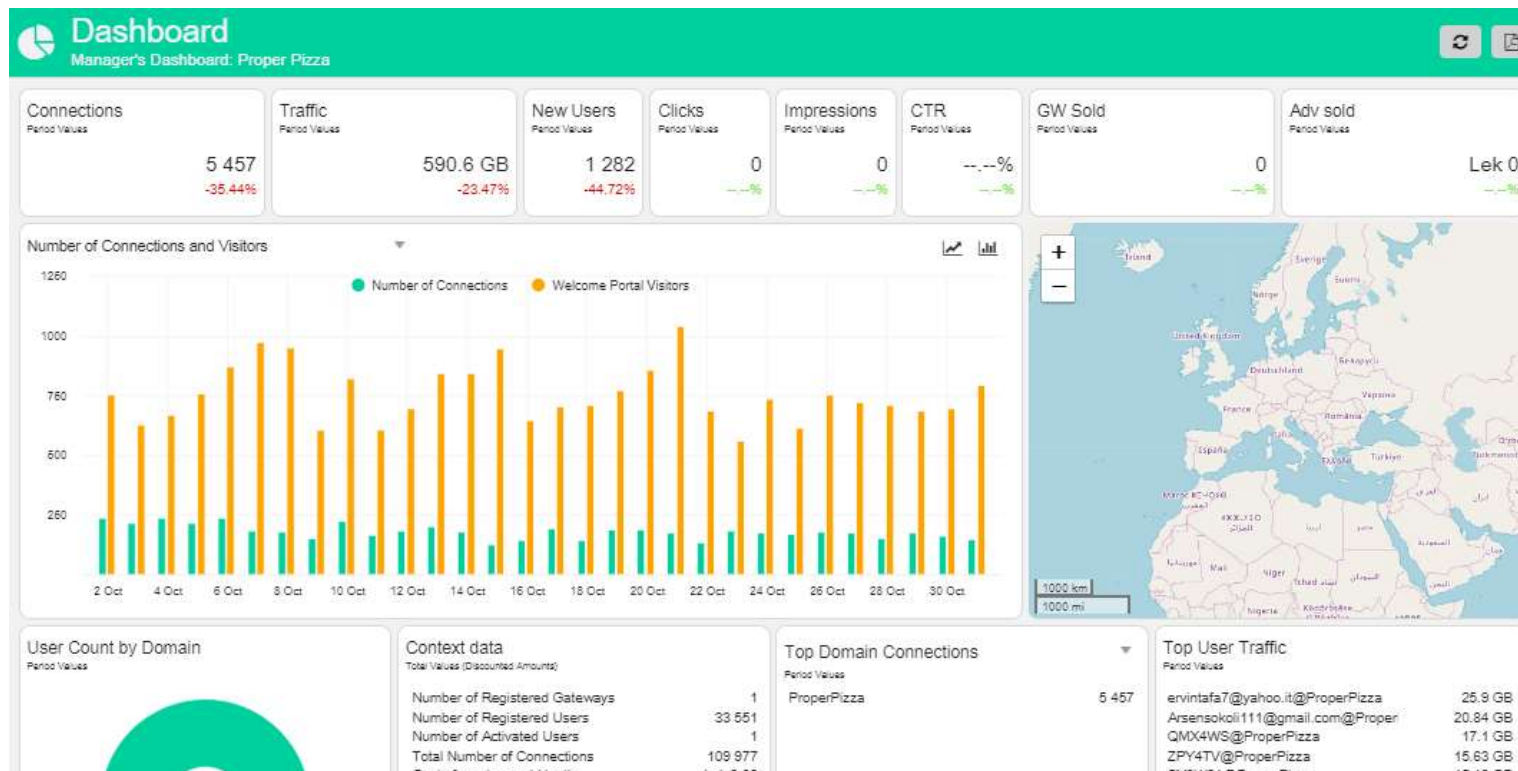
- **Hotspot Network Manager**
- **Project Summer WiFi**
- **Image for configuration**



# ANOTHER “MADE FOR MIKROTIK” SOFTWARE

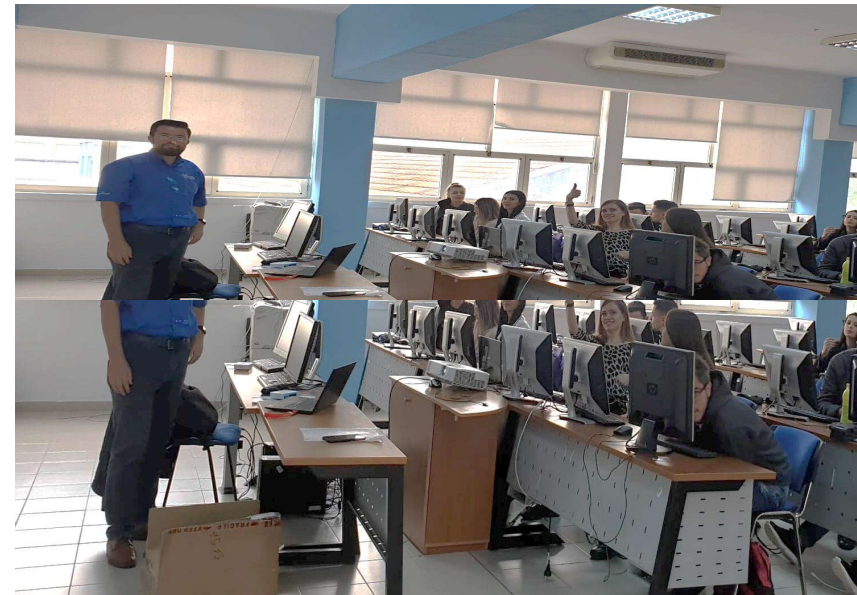


# ANOTHER “MADE FOR MIKROTIK” SOFTWARE



# TRAINING

- **Most of the staff have some MikroTik training**
- **Company benefit from trained staff**
- **Involved in MikroTik Academy**





# LAST WORD



- “*Routing the world*” is challenging like a marathon
- We are all winners as long as we keep running
- MikroTik team will cheer and support us in every turn

# THANKS TO THE TEAM...!

