



MUM BULGARIA

SOFIA, June 4th, 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

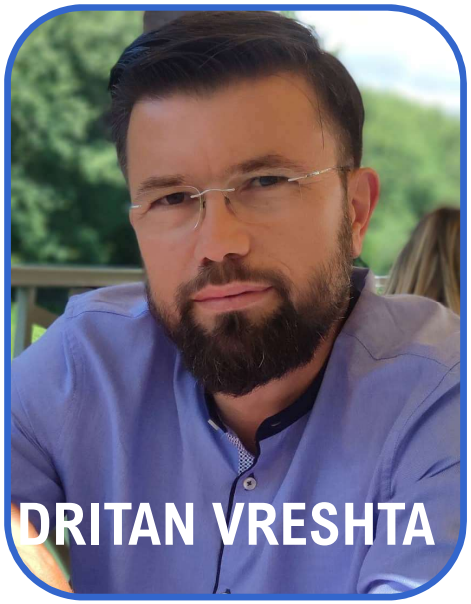
SPLYNX

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



ACCESS POINTS AND TOWERS



ACCESS POINTS AND TOWERS



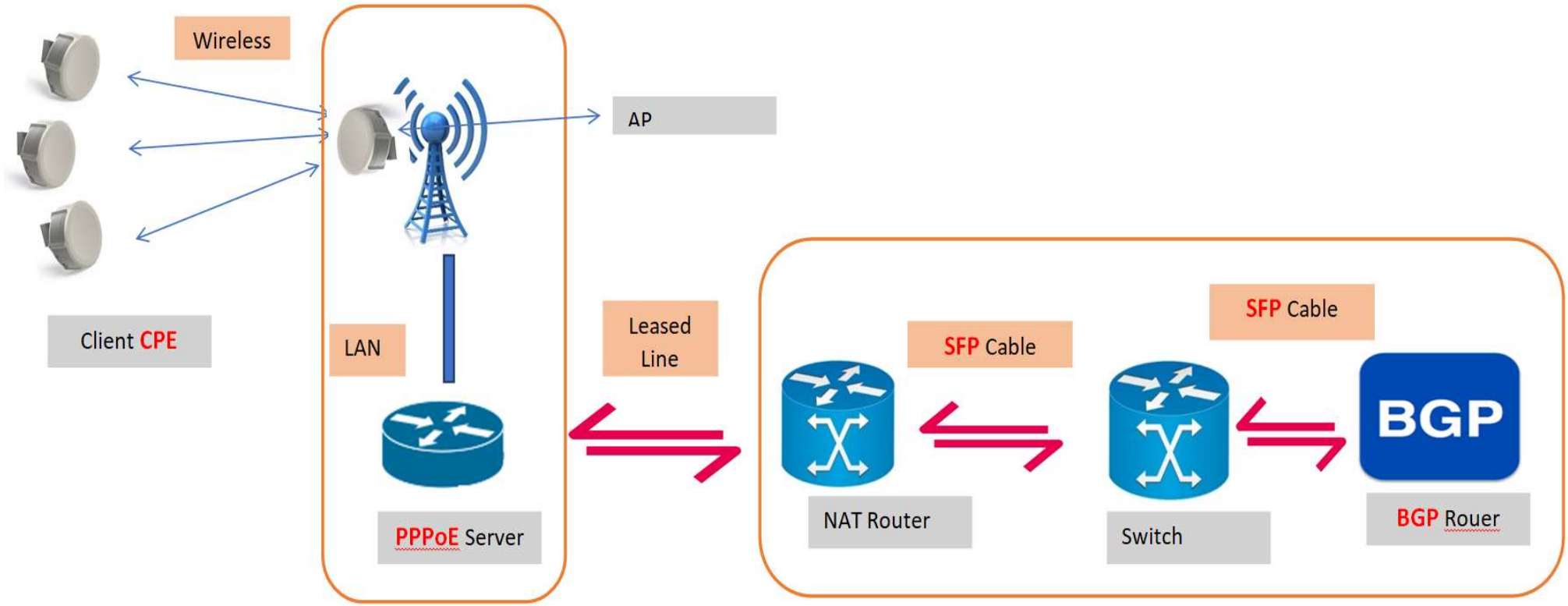
BACKBONE AND CORE

- 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



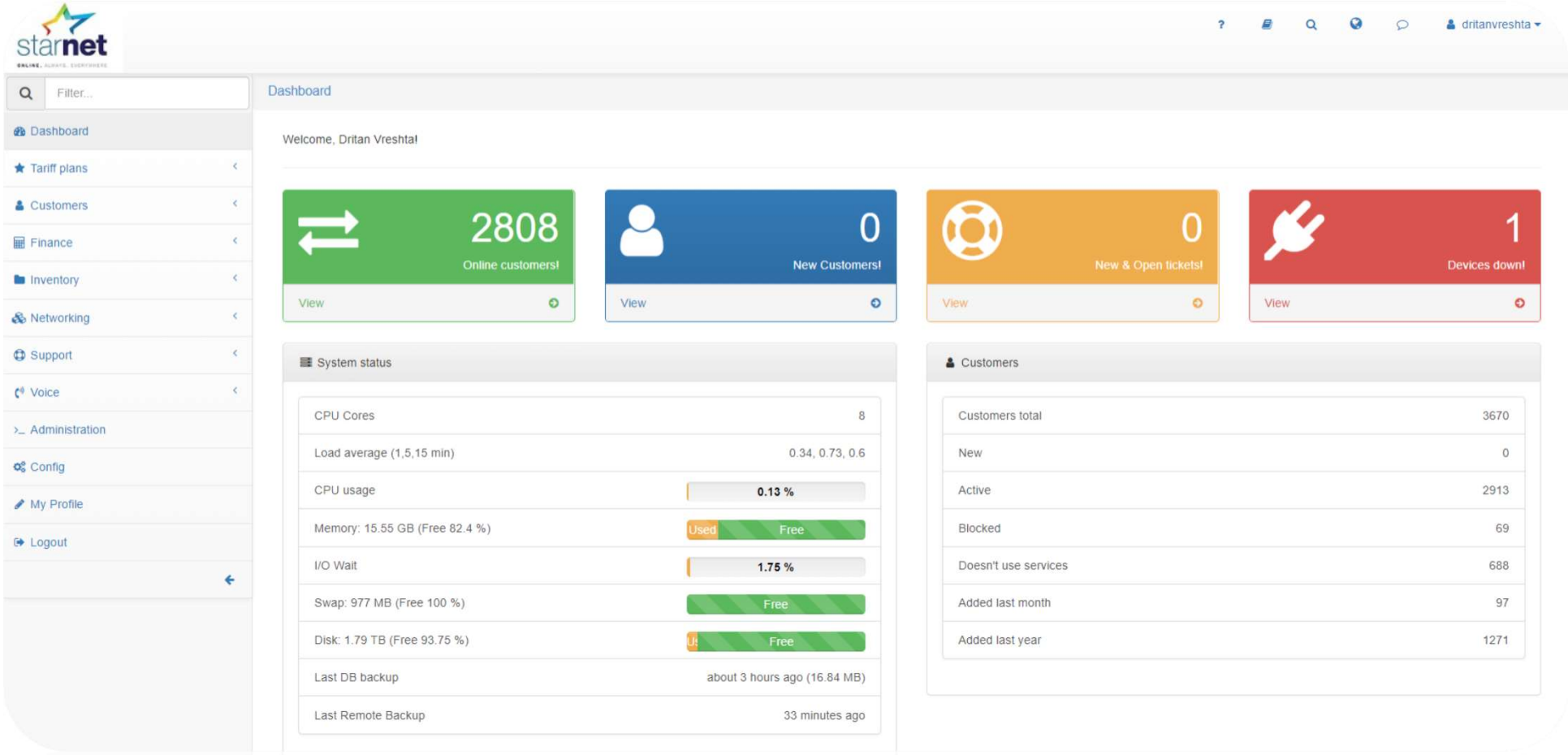
Why PPPoE?

- 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

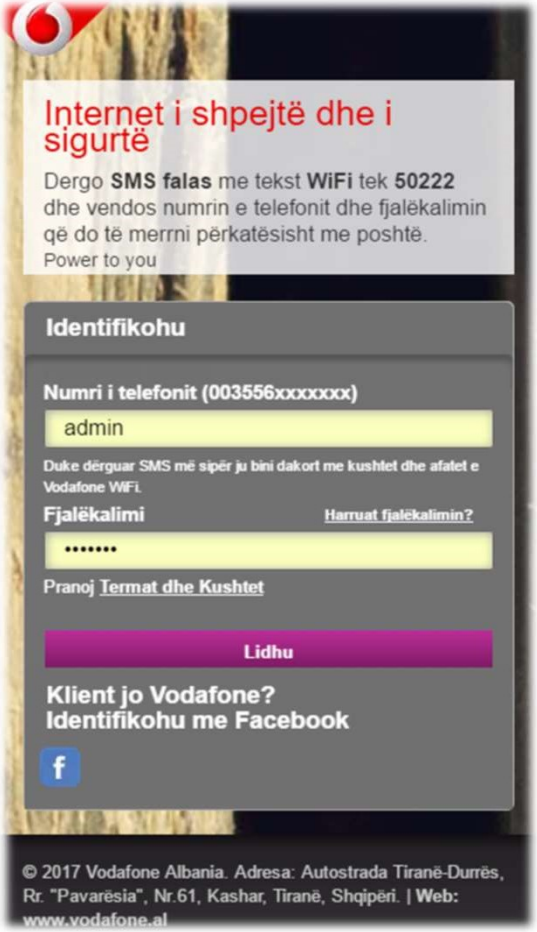


PROJECT BASED ON MIKROTIK

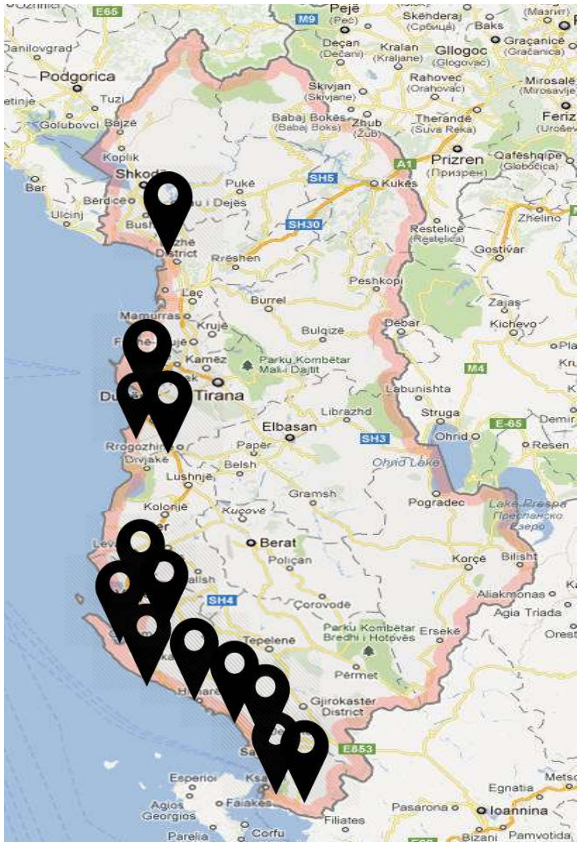
- Hotspot Networks
- Configuration examples
- VPN concentrator for satellite networks
- Network integration with other operators
- Use of MikroTik in FTTH projects

WELCOME PORTAL AND LOGIN MENU
(SUMMER WIFI PROJECT)





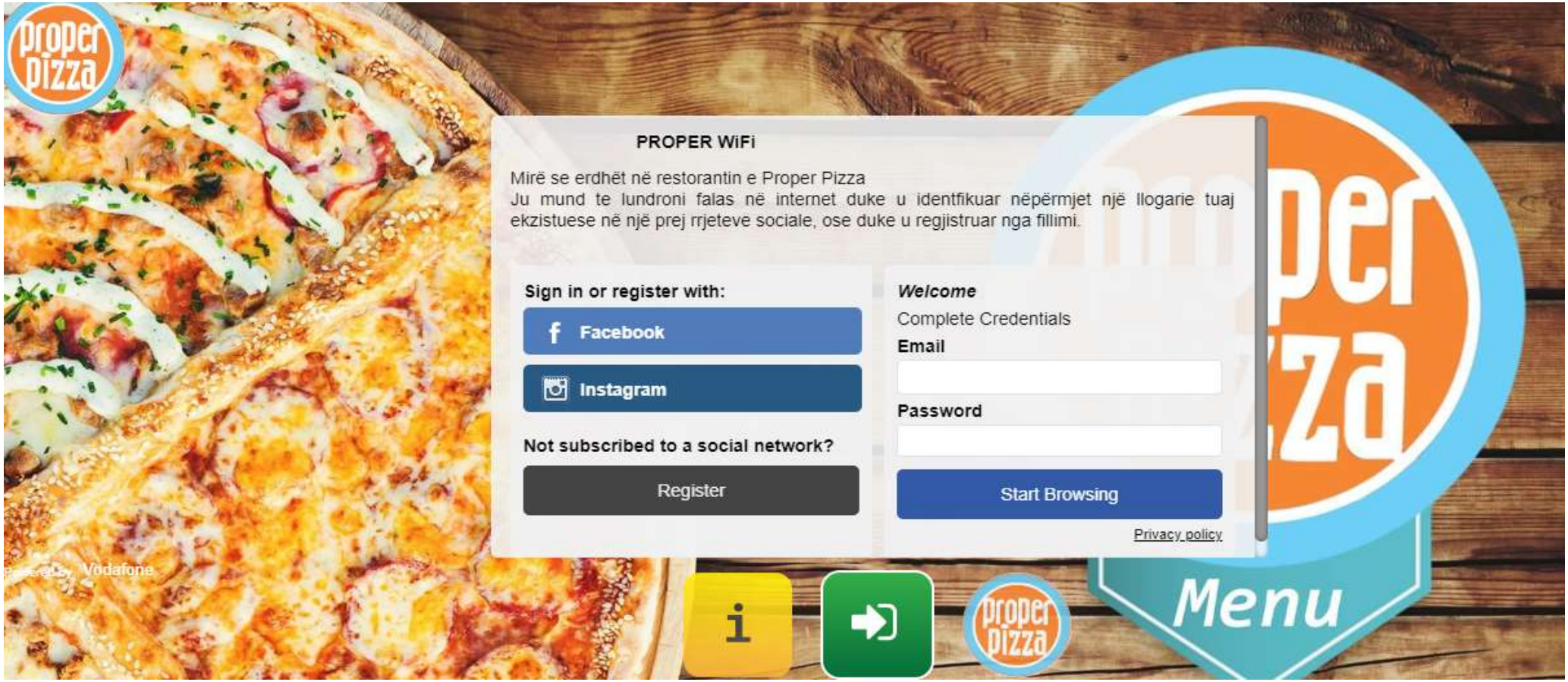
MAP AND USED HARDWARE
(SUMMER WIFI PROJECT)


Podgorica
Shkodër
Tirana
Elbasan
Berat
Prizren
Pejë
Gjirokastër
Ioannina
Ohrid
Ohrid Lake
Prespa Lake
Korçë
Fier
Vlorë
Sarandë
Kukës
Lushnjë
Durrës
Kamëz
Librazhd
Pogradec
Përmet
Tepelenë
Çorovodë
Kuçovë
Fier
Lezhë
Kavajë
Peshkopi
Burrel
Bulqizë
Dibër
Kukës
Rrëshen
Laç
Krujë
Mamurras
Vorë
Rrogozhinë
Lushnjë
Kolonjë
Gramsh
Skrapar
Patos
Fier
Roskovec
Ballsh
Selenicë
Vlorë
Himarë
Sarandë
Delvinë
Konispol
Finiq
Saranda
Gjirokastër
Tepelenë
Përmet
Leskovik
Kolonjë
Korçë
Devoll
Bilisht
Ersekë
Agia Triada
Aliakmonas
Çorovodë
Berat
Polican
Kuçovë
Fier
Lushnjë
Belsh
Paper
Ohrid
Struga
Labunishta
Librazhd
Elbasan
Tirana
Kamëz
Vorë
Krujë
Mamurras
Lezhë
Shkodër
Koplik
Vau i Dejës
Puke
Rrëshen
Burrel
Peshkopi
Bulqizë
Dibër
Kukës
Prizren
Restelicë
Gostivar
Zajas
Kichevo
Debar
Struga
Ohrid
Resen
Demir
Pogradec
Lake Prespa
Korçë
Bilisht
Aliakmonas
Agia Triada
Ersekë
Orest
Metsovo
Egnatia
Pasarona
Filiates
Corfu
Parelia
Agios Georgios
Faiakes
Esperios
Ksamil
Bizani
Pamvotida
Zhelino
Qafeshqipe
Gllogoc
Graçanicë
Rahovec
Mirosalë
Therandë
Babaj Bokës
Zhub
Skivjan
Tuzi
Golubovci
Bajzë
Podgorica
Danilovgrad
Ulcinj
Bar
Bërdicë
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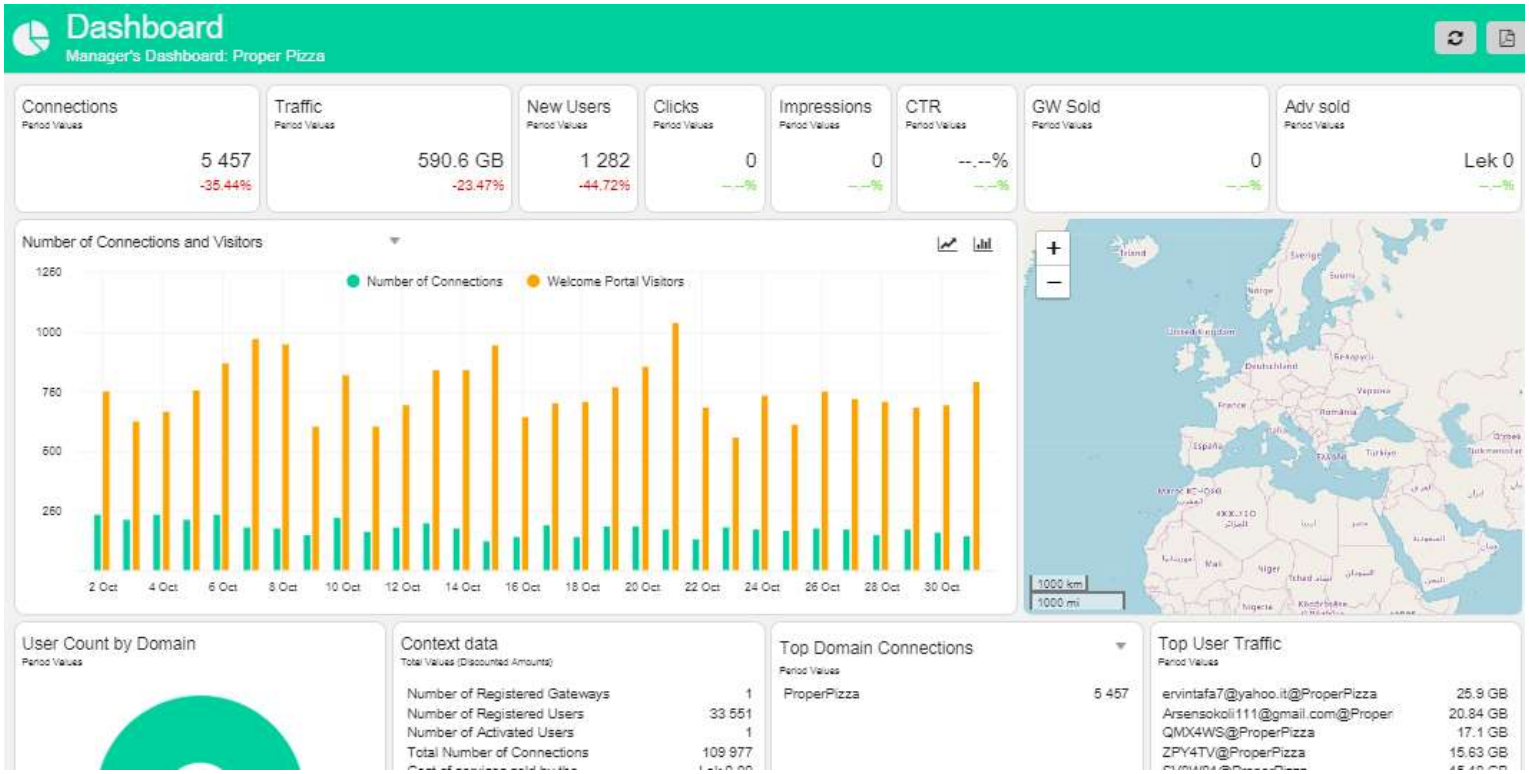
ANOTHER “MADE FOR MIKROTIK” SOFTWARE

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

ANOTHER “MADE FOR MIKROTIK” SOFTWARE

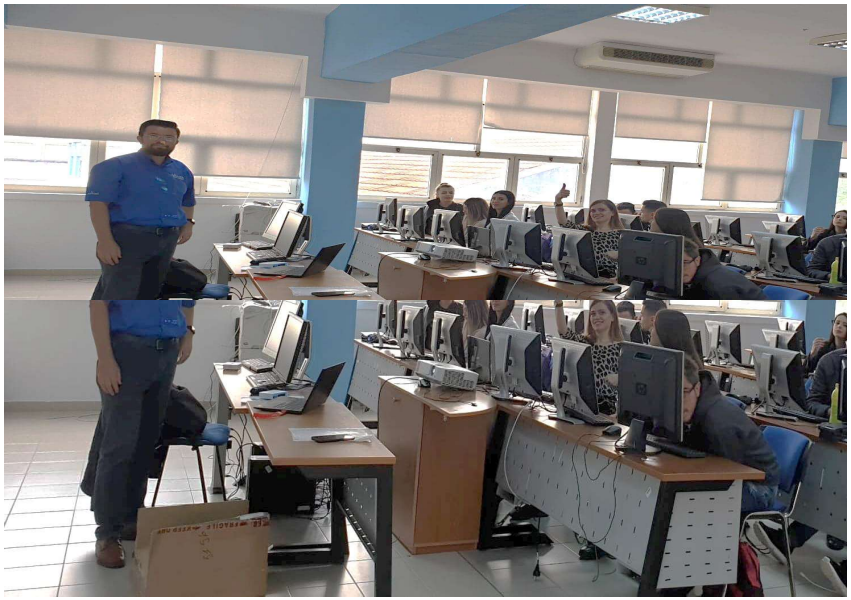


ANOTHER "*MADE FOR MIKROTIK*" SOFTWARE



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…!

