LARGE SCALE INSTALLATIONS WITH CAPSMAN

MUM 2017 in Milan, Italy

by Stavros Maragkoudakis

HELLASCOM

ABOUT ME

Introduction

Stavros Maragkoudakis

Hellascom Ltd, Managing Director

MikroTik Distributor in Greece since 2001

COMPANY PRESENTATION IN BRIEF

Introduction

- Hellascom is a Commercial – Technical Company which was established in 1998. Since 2001, we distribute and support MikroTik products.
  We provide professional **Communication solutions,** with emphasis in **WiFi** systems.
  We sell our products to our resellers and end users through our electronic shop www.linkshop.gr and from our offices at 12, Akti Themistokleous str.
- Hellascom acts also as system **Integrators,** in **Hotels WiFi** and in Highways Road, **Tunnels Radiocommunication** large scale infrastructure Projects.

- Hellascom provides **full after sales & training support** to our resellers and end users.

LOCATION OF OUR COMPANY, ZEA MARINA AT PIRAEUS GREECE

Introduction

PRESENTATION AGENDA

- Part 1. Introduction
- Part 2. Elounda Hotels & Resorts, a 600 AP's WiFi Large scale Projects.
- Part 3. Largest Hellenic General Hospital of Athens "Evaggelismos", a 200 AP's WiFi Project

KEY POINTS OF A LARGE SCALE WIFI PROJECT

Part 1 . Introduction

Our staff very long term experience in Radiocomunication (since 1972) gave us the ability to securely determine the critical key requirements of a large scale WiFi project.

> The most important one, is the selection of **reliable** equipment's.

> The second one is the use of **ONLY fully tested** firmware.

> The third is the careful **examination** of the potential existing structured **cabling**!

> The fourth is a careful **Radio coverage live** measurements and study.

> The fifth is the proper selection of **central management tools** and interfaces.

> The sixth, by all means **avoid!** expose the Antenna lobe of certain AP's against same channel **multi AP's signal leakages**, even if these are very low signals. (**Anti noise shields**, or antenna **lobe direction change** not be opposite leakages are workable **solutions**).

> And finally **never feed** near by AP's from **different** active switches/routers, if these AP's are on **same channel and overlapping about same areas,** this is a very critical requirement in order to avoid packets on the same channel to coexist in the same area with **phase delay! If this will not achieved** the users will see very **healthy** RF Signals, **BUT they will be unable even to login in these AP's areas!**

LOCATION OF ELOUNDA RESORT HOTEL, A VERY LARGE SCALE 600 AP'S WIFI PROJECT

Part 2. Elounda Hotels & Resorts

The company Elounda sa owns and manages three luxury resorts in the area of Elounda in Crete, Greece.

- Elounda Peninsula
- Porto Elounda
- Elounda Mare

ELOUNDA PENINSULA

Part 2. Elounda Hotels & Resorts

- Elounda Peninsula is the luxury suite section of the hotel group.

PORTO ELOUNDA

Part 2. Elounda Hotels & Resorts

- Porto Elounda is the spa & golf resort.

ELOUNDA MARE

Part 2. Elounda Hotels & Resorts

- Elounda Mare is the classic hotel of the group.

WHAT THE CLIENT REQUESTED

Part 2. Elounda Hotels & Resorts

- Inspection of the existing Ethernet and Fibre Optical Network.
- Fully indoor and outdoor coverage, with not less than -60dBm signal to the client areas.
- A Central WiFi Management platform.
- Visitors Internet access through Hotspot, including Social Networks (Facebook, twitter, e-mail, sms) login, with bandwidth control per visitor’s account.
- Connection with Fidelio platform, for clients that require a higher Internet bandwidth with additional charge.
- Coexistence of secondary SSID for the Hotel Staff and POS terminals.

FIRST SITE VISIT FOR THE PROJECT SITE CONDITIONS EVALUATION

Part 2. Elounda Hotels & Resorts

- Project Major importance subjects, include the site visit for and a live evaluation and inspection, of the four following major importance key requirements:

  > **Structured Cabling visual inspection & performance measurements**.

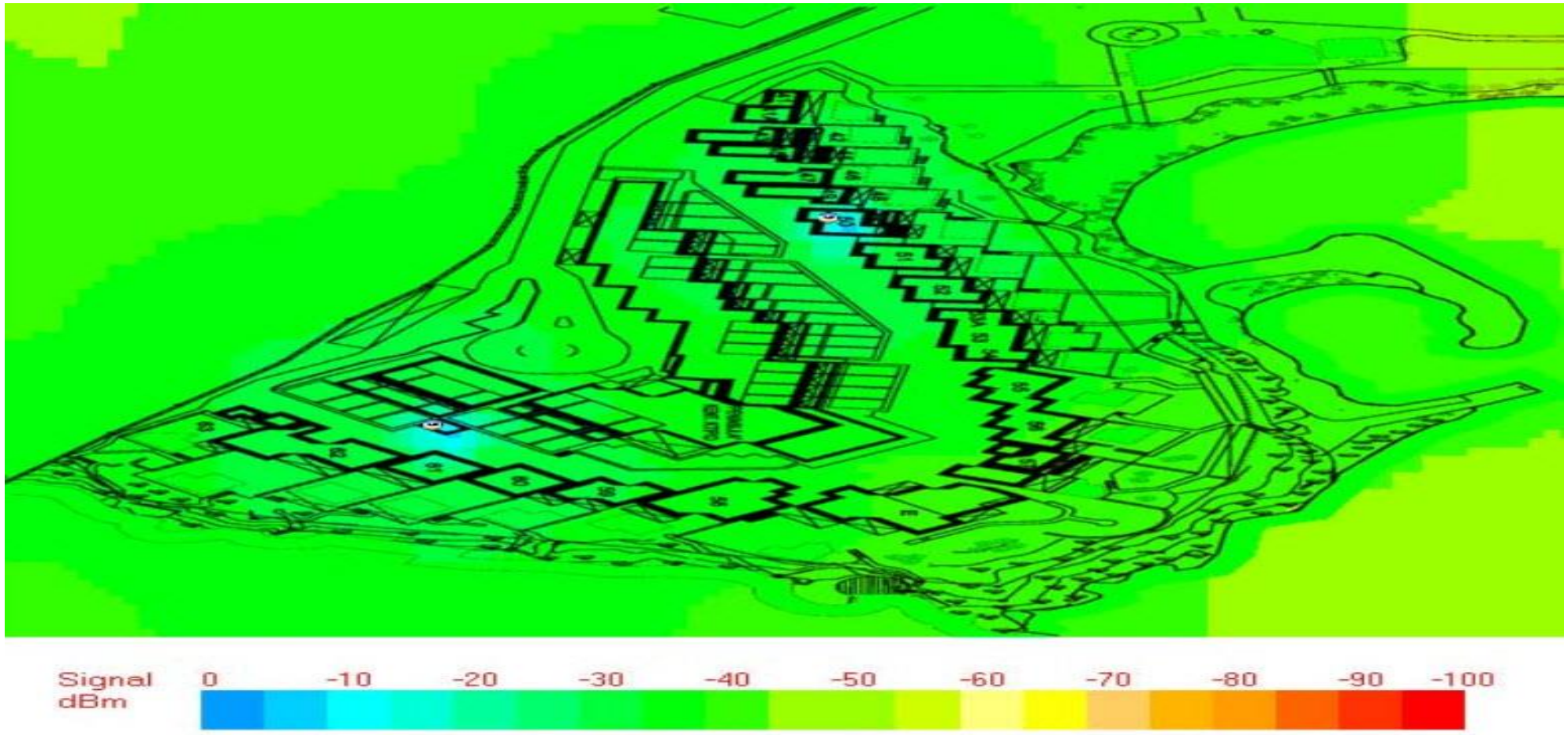
  > **Fibre Optical cabling visual inspection & performance measurements**.

  > Live **Radio coverage measurements** per Access point, with AP's Location prediction preparation, via a proper Radio coverage prediction software.

  > **Inspection** of the indoor and outdoor **wiring & Installation Restrictions** regarding the minimum **visual appearance** of the **Access point** to the Hotel Visitors.

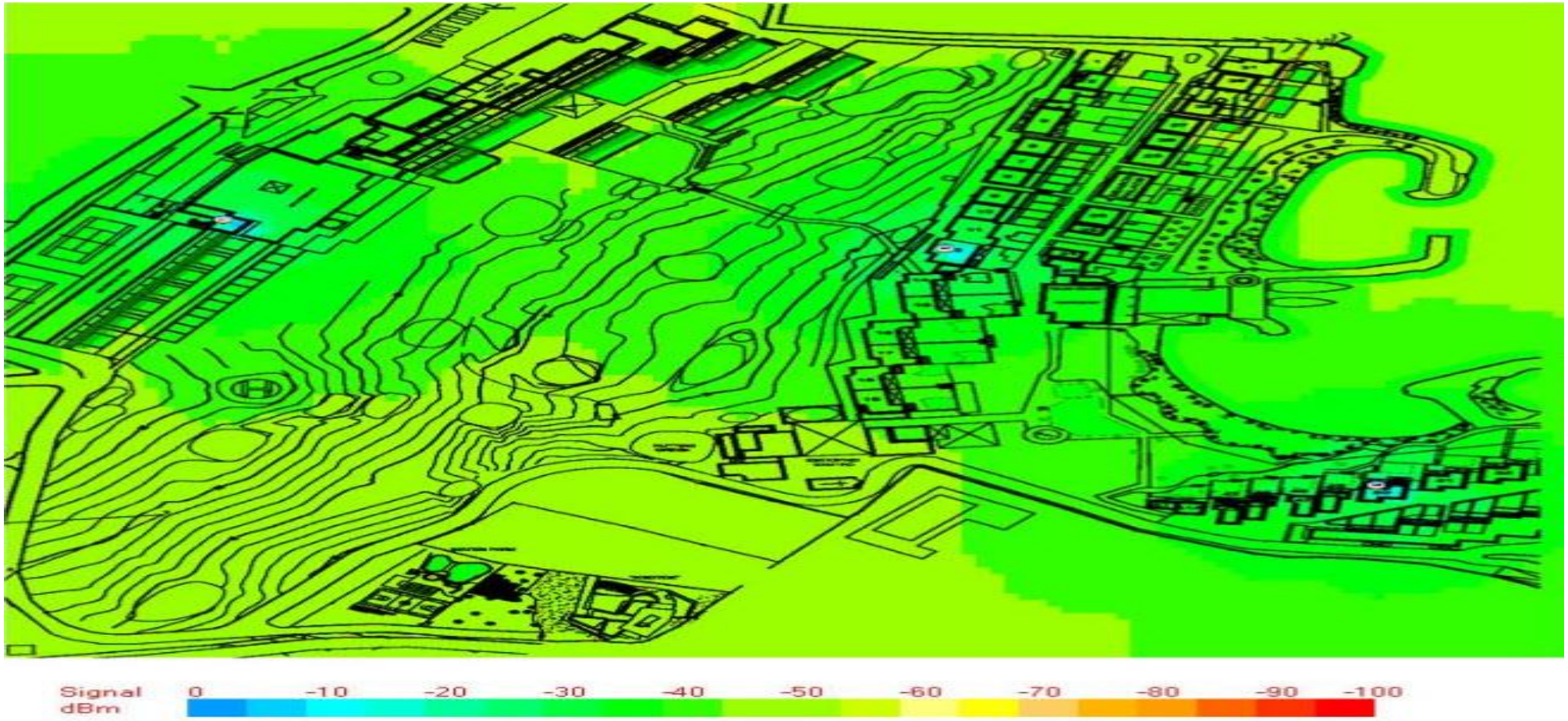
OUTDOOR GENERAL RADIO COVERAGE MEASUREMENTS SAMPLE AT PENINSULA

Part 2. Elounda Hotels & Resorts



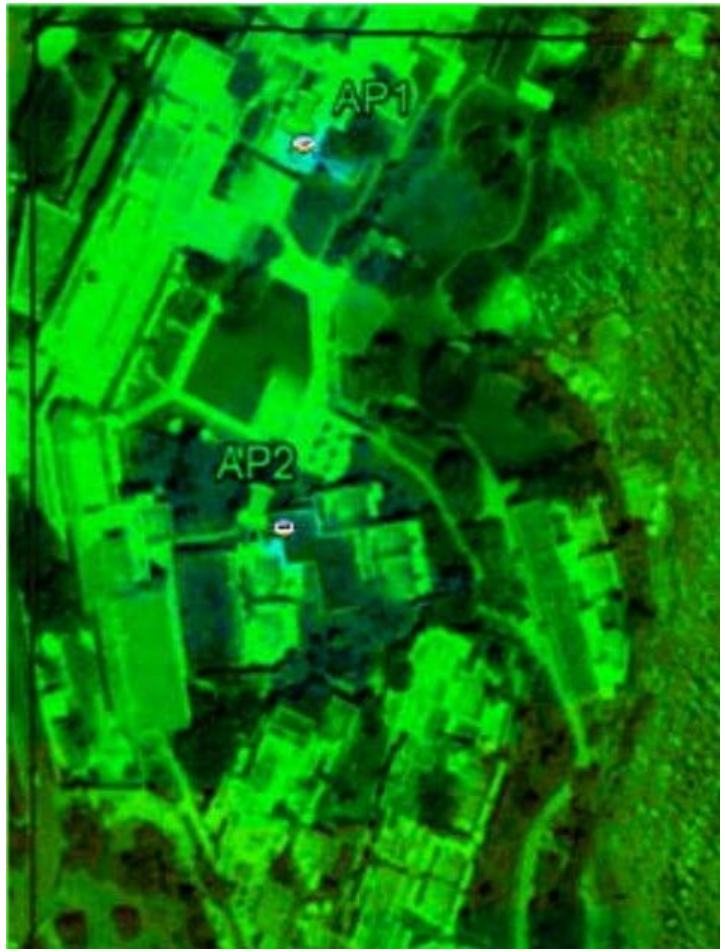
OUTDOOR GENERAL RADIO COVERAGE MEASUREMENTS SAMPLE AT PORTO

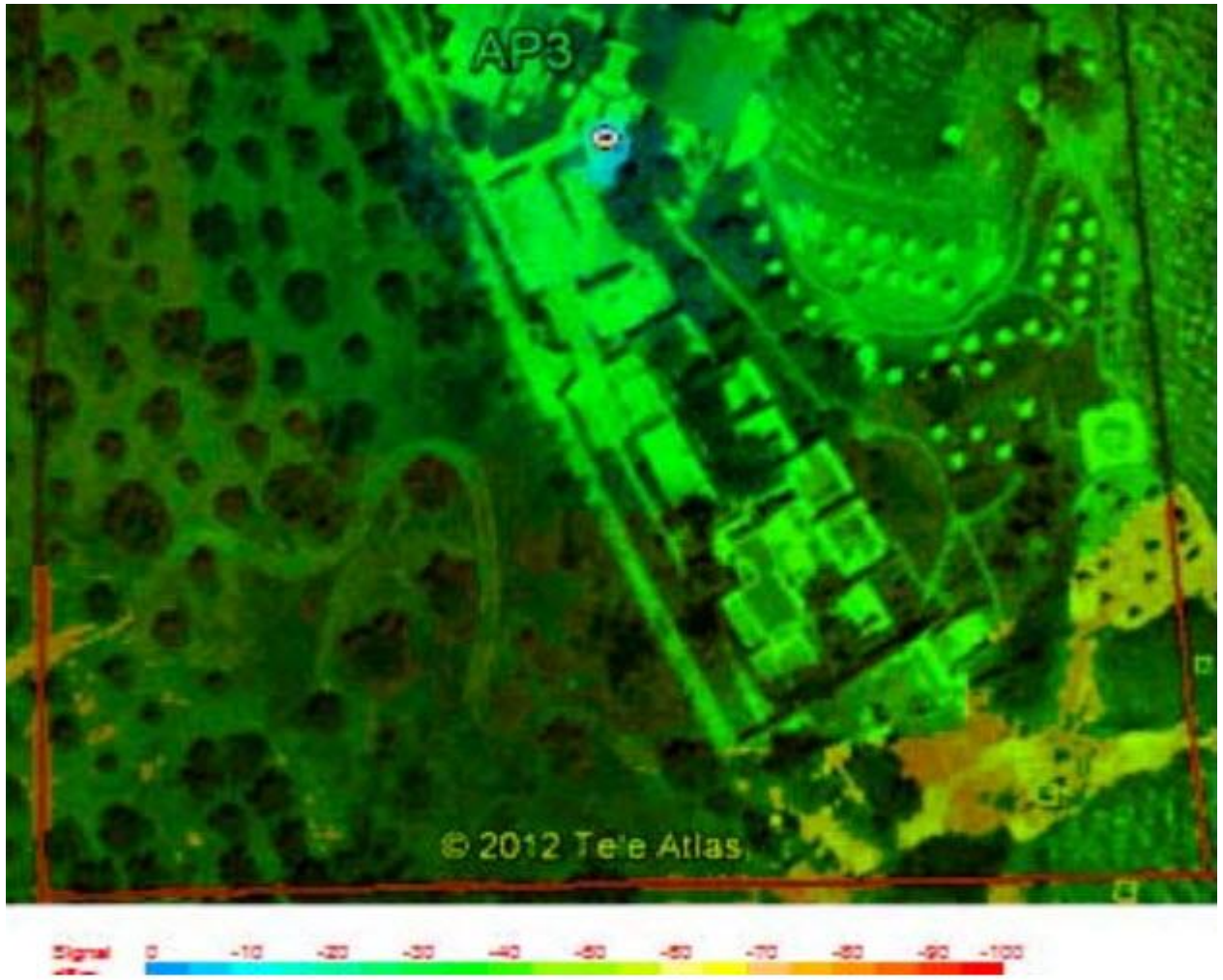
Part 2. Elounda Hotels & Resorts



OUTDOOR GENERAL RADIO COVERAGE MEASUREMENTS SAMPLE AT MARE

Part 2. Elounda Hotels & Resorts

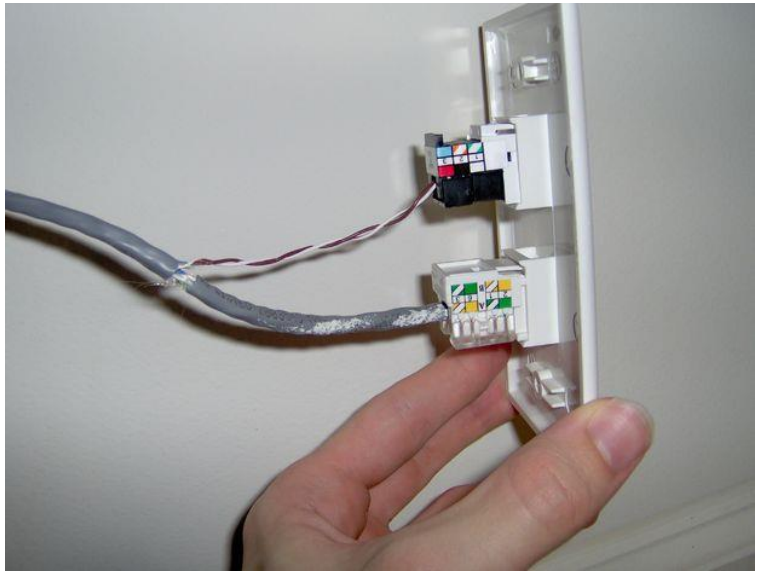


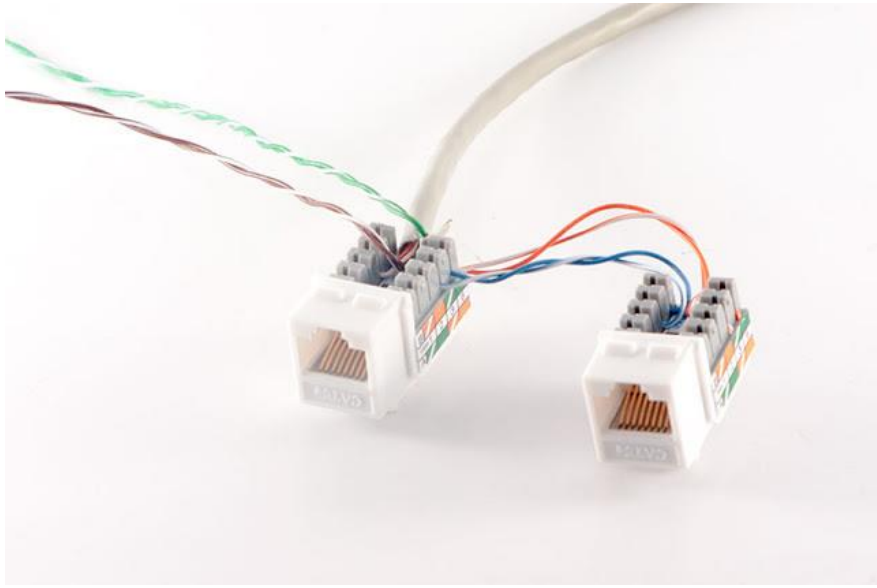


STRUCTURED CABLING INSPECTION

Part 2. Elounda Hotels & Resorts

- The visual inspection of the Hotel Ethernet structured cabling and connection was done at each access point installation position.
  - We came up with the usual electricians huge mistakes. Telephone line connection on the not in use for baseT100 Ethernet cable cores as you can see in the following photos.





VISUAL AND PERFORMANCE INSPECTION OF THE FIBER OPTIC BACK BONE'S BETWEEN THE THREE-HOTEL COMPLEXES

Part 2. Elounda Hotels & Resorts

- Inspection of the hotel complex fiber optic back bone for the three-hotel interconnection.
- Inspection of the back bone central feeding points to the Regional fiber optic cabling concentrators to the visitors suites.

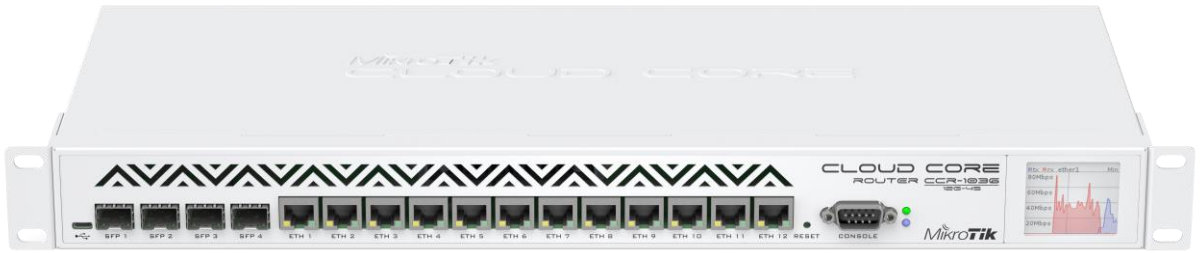
KEY POINTS OF ACCESS POINTS INSTALLATION SITES SELECTION

Part 2. Elounda Hotels & Resorts

- The key fact of a successful Project requires a very careful, Access points radio coverage prediction and **same channel overlapping avoidance**, with **more than 16db signal difference**, especially in visitors **high concentration** areas.
- Also **high importance key** fact, is the protection (via additional **anti-noise shields** or **Antenna lobe** direction change), of **outdoor** Access points at High concentration Visitors areas (Bars – Restaurants – Beaches etc.), if these are located **opposite** main buildings with **multi Access points**, as even low level unwanted RF signals leakages from these multi AP's, will **block** the proper operation of the opposite located **outdoor ones**.
- At the specific project indoor spaces a **-60dbm** radio coverage obtained, due the main Buildings **walls** pass through low RF **signal losses,** fact that permitted us to **decrease** the total number of the required access points **to one (1) per Two (2) apartments**, which was a very important also key fact for the project total **cost** .

SYSTEM CENTRAL MANAGEMENT EQUIPMENT

Part 2. Elounda Hotels & Resorts



1 pcs

Product specifications

Details	
Product code	CCR1036-12G-4S-EM
SFP DDMI	Yes
CPU nominal frequency	1.2 GHz
CPU core count	36
Size of RAM	16 GB
Architecture	TILE
10/100/1000 Ethernet ports	12
Operating System	RouterOS v6 (64bit)
License level	6
SFP ports	4

SWITCHES

Part 2. Elounda Hotels & Resorts

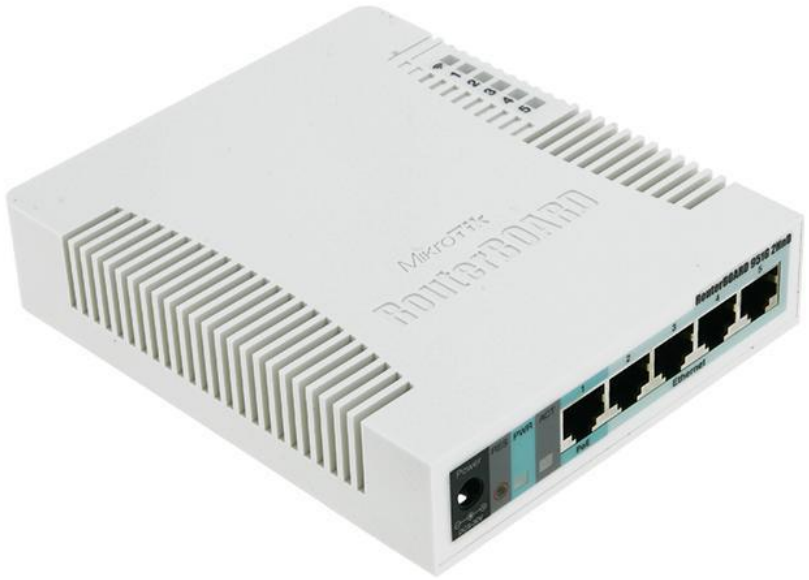
35 pcs

Product specifications

Details	
Product code	CRS125-24G-1S-RM
SFP DDMI	Yes
CPU nominal frequency	600 MHz
CPU core count	1
Size of RAM	128 MB
Architecture	MIPS-BE
10/100/1000 Ethernet ports	24
Operating System	RouterOS
License level	5
SFP ports	1

INDOOR ACCESS POINT

Part 2. Elounda Hotels & Resorts



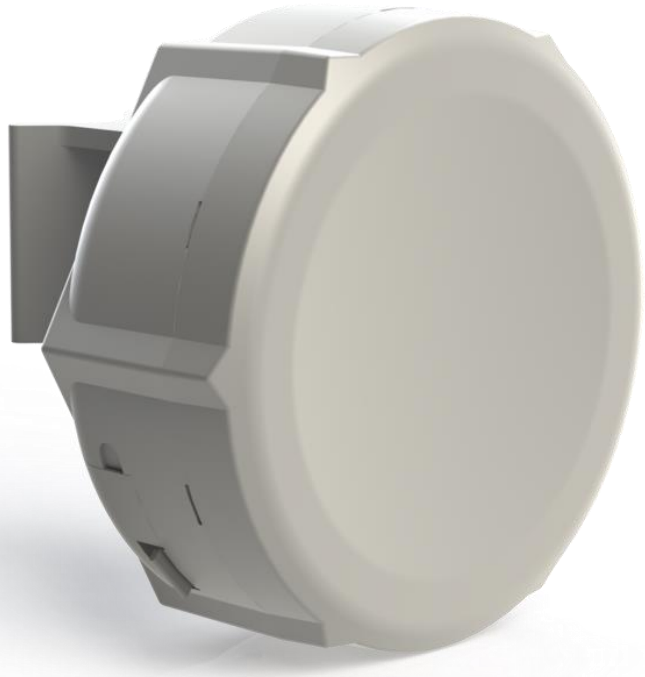
600 pcs

Product specifications

Details	
Product code	RB951G-2HnD
CPU nominal frequency	600 MHz
CPU core count	1
Size of RAM	128 MB
Architecture	MIPS-BE
10/100/1000 Ethernet ports	5
Operating System	RouterOS
License level	4

OUTDOOR ACCESS POINT

Part 2. Elounda Hotels & Resorts



30 pcs

Product specifications

Details	
Product code	RBSXTG-2HnD
CPU nominal frequency	600 MHz
CPU core count	1
Size of RAM	64 MB
Architecture	MIPS-BE
10/100/1000 Ethernet ports	1
Operating System	RouterOS
License level	4

INDUSTRIAL PASSIVE POE

Part 2. Elounda Hotels & Resorts

Product specifications

Details	
Ways	2
LAN Ports	Gigabit Ethernet 10/100/1000
Power Supply	12 … 24V
Overvoltage Protection	Up to 25kV with low capacitive ESD Transil
Discharge Current	Up to 15kA with 4 surge arresters on each port
Operating Temperature	-30°C … +65°C
Mounting	Wall mounting or standard DIN support

INDUSTRIAL POWER SUPPLY

Part 2. Elounda Hotels & Resorts

Product specifications

Features

- Universal AC input / Full range
- Protections: Short circuit / Overload / Over voltage / Over temperature
- Cooling by free air convection
- Can be installed on DIN rail TS-35/7.5 or 15
- LED indicator for power on
- 100% full load burn-in test
- Fix switching frequency at 100KHz

ANTI-NOISE SHIELD

Part 2. Elounda Hotels & Resorts

Product specifications

Anti-noise shield for Router BOARD SXT
Substantially reduces interference noise level generated
By nearby electronic devices, as well as, even from our own nearby access points on the same channel.
Thus it improves the signal quality with result higher bandwidth.
The Shield is made from aluminum coated with light grey paint

EQUIPMENTS INTEGRATION ACCEPTANCE TEST & CONFIGURATION STEPS, AT OUR TECHNICAL DEPARTMENT

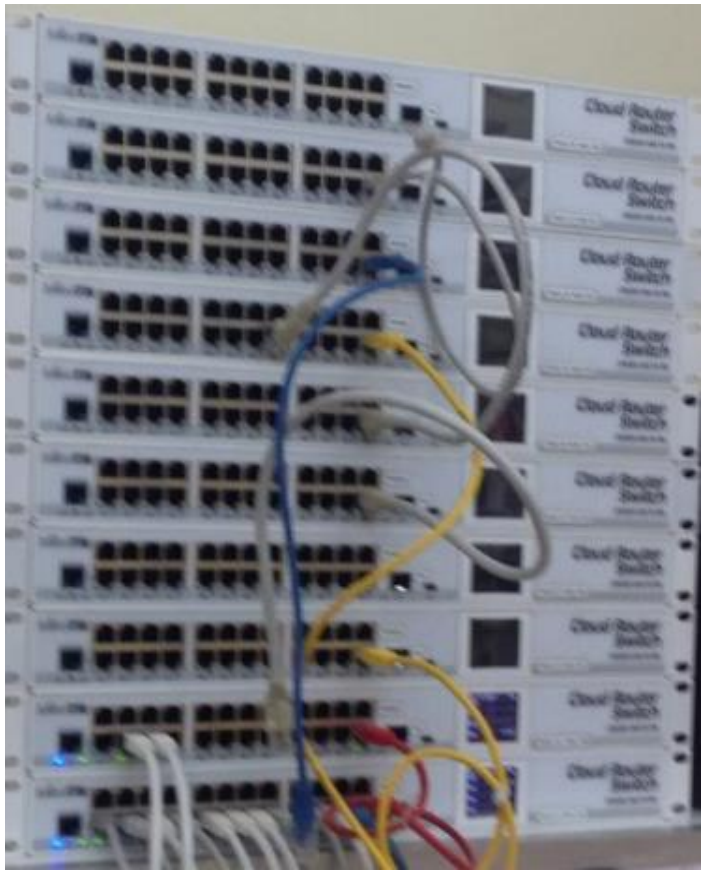
Part 2. Elounda Hotels & Resorts

- The first step is the equipments acceptance, inspection and tests at laboratory environment before the installation.

EQUIPMENTS INTEGRATION ACCEPTANCE TEST & CONFIGURATION STEPS, AT OUR TECHNICAL DEPARTMENT

Part 2. Elounda Hotels & Resorts

- For the specific project, we upgraded the equipment with the **RouterOS 6.11rc**, which had embedded the **CAPSMAN Beta** version in it.



EQUIPMENTS INTEGRATION ACCEPTANCE TEST & CONFIGURATION STEPS, AT OUR TECHNICAL DEPARTMENT

Part 2. Elounda Hotels & Resorts

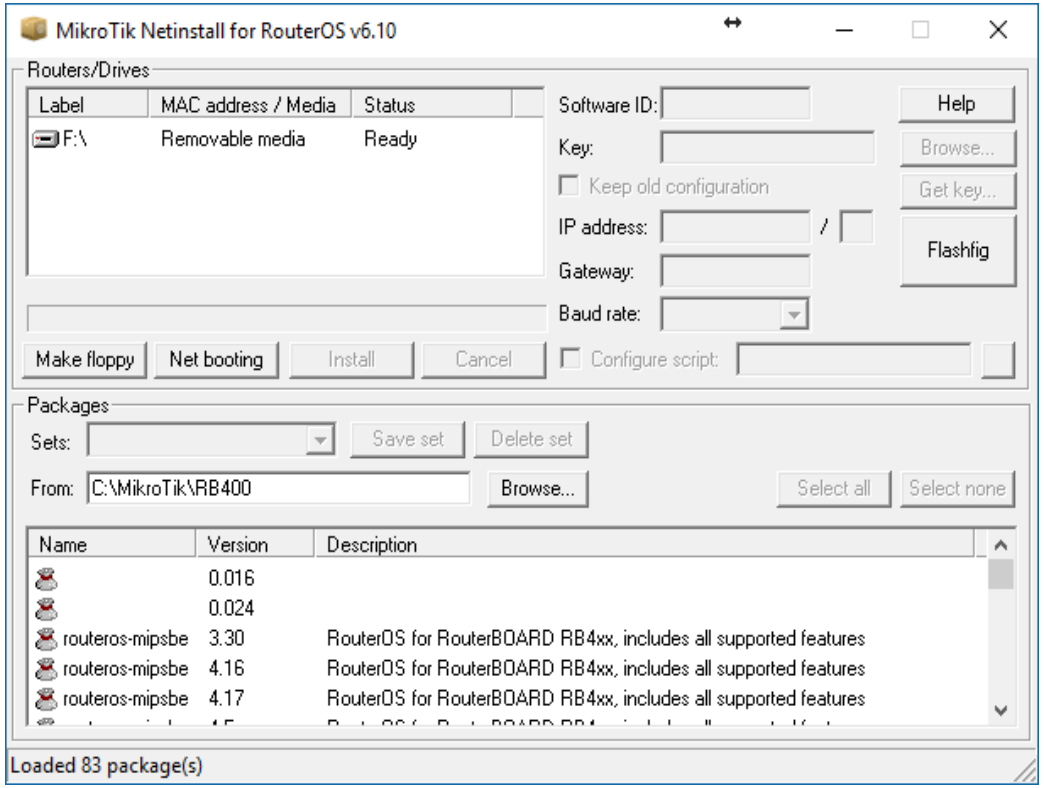
- **Script setup** preparation was done in **multiple txt** files through **Netinstall**.
- In each interface configuration, we embed the necessary **comments**, for easier **future Support**.

```
/interface bridge port add interface=ether4 bridge=bridge-hotspot
/interface bridge port add interface=ether6 bridge=bridge-hotspot
/interface bridge port add interface=ether8 bridge=bridge-hotspot
/interface bridge port add interface=ether10 bridge=bridge-hotspot
/interface bridge port add interface=ether12 bridge=bridge-hotspot
/interface bridge port add interface=ether14 bridge=bridge-hotspot
/interface bridge port add interface=ether16 bridge=bridge-hotspot
/interface bridge port add interface=ether18 bridge=bridge-hotspot
/interface bridge port add interface=ether20 bridge=bridge-hotspot
/interface bridge port add interface=ether22 bridge=bridge-hotspot
/interface bridge port add interface=ether24 bridge=bridge-hotspot
/interface ethernet set ether3 master-port=ether1
/interface ethernet set ether5 master-port=ether1
/interface ethernet set ether7 master-port=ether1
/interface ethernet set ether9 master-port=ether1
/interface ethernet set ether11 master-port=ether1
/interface ethernet set ether13 master-port=ether1
/interface ethernet set ether15 master-port=ether1
/interface ethernet set ether17 master-port=ether1
/interface ethernet set ether19 master-port=ether1
/interface ethernet set ether21 master-port=ether1
/interface ethernet set ether23 master-port=ether1
/interface ethernet set ether1 comment="POE-AccessPoint"
/interface ethernet set ether3 comment="POE-AccessPoint"
/interface ethernet set ether5 comment="POE-AccessPoint"
/interface ethernet set ether7 comment="POE-AccessPoint"
/interface ethernet set ether9 comment="POE-AccessPoint"
```

EQUIPMENTS INTEGRATION ACCEPTANCE TEST & CONFIGURATION STEPS, AT OUR TECHNICAL DEPARTMENT

Part 2. Elounda Hotels & Resorts

- Equipments configuration steps were done with **Netinstall** and **scripts** use.



EQUIPMENTS INTEGRATION ACCEPTANCE TEST & CONFIGURATION STEPS, AT OUR TECHNICAL DEPARTMENT

Part 2. Elounda Hotels & Resorts

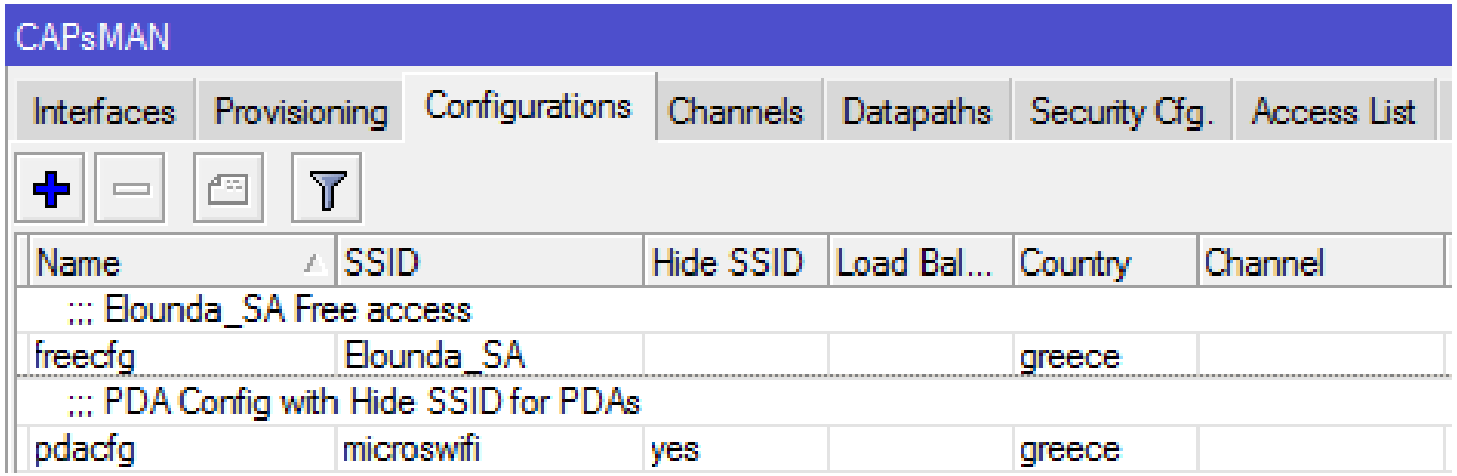
- In this large scale project we successfully embedded the new **RouterOS CAPsMAN** Capability.
- Every system equipment was coded and registered in the **CAPsMAN**.

	Name	Type
MI	TunID:1180 - Porto 418-1	Interfaces
MI	TunID:1181 - Porto 416-1	Interfaces
MI	TunID:1182 - Porto 514-1	Interfaces
MI	TunID:1183 - Porto 517-1	Interfaces
SMB	TunID:1184 - Porto 520-1	Interfaces
MI	TunID:1185 - Porto 524-1	Interfaces
MI	TunID:1186 - Porto 609-1	Interfaces
MI	TunID:1187 - Porto 611-1	Interfaces
SMB	TunID:1188 - Porto 228-1	Interfaces
SMB	TunID:1189 - Porto 225-1	Interfaces
RSMB	TunID:1190-1	Interfaces
SMB	TunID:1191 - Porto 219-1	Interfaces
SMB	TunID:1192 - Porto 319-1	Interfaces
MI	TunID:1193 - Mare 3-1	Interfaces
MI	TunID:1194 - Mare 4-1	Interfaces
SMB	TunID:1230 - Porto 322-1	Interfaces
SMB	TunID:1231 - Porto 325-1	Interfaces
SMB	TunID:1232 - Porto 328-1	Interfaces
SMB	TunID:1233 - Porto 330-1	Interfaces
MI	TunID:1234 - Porto 426-1	Interfaces
MI	TunID:1235 - Porto 429-1	Interfaces
MI	TunID:1236 - Porto 432-1	Interfaces

EQUIPMENTS INTEGRATION ACCEPTANCE TEST & CONFIGURATION STEPS, AT OUR TECHNICAL DEPARTMENT

Part 2. Elounda Hotels & Resorts

- In **CAPsMAN** configuration we added **two** different SSID, one for the **clients** and a second one for the Hotel **POS** system.



EQUIPMENTS INTEGRATION ACCEPTANCE TEST & CONFIGURATION STEPS, AT OUR TECHNICAL DEPARTMENT

Part 2. Elounda Hotels & Resorts

- Before the system configuration was completed, we registered the equipment details in table files with data as location – serial Numbers – IP etc.

SerialNumbers-Routerboards

Αρχείο Επεξεργασία Προβολή Εισαγωγή Μορφή Δεδομένα Εργαλεία Πρόσθετα Βοήθεια

Σχόλια Κοινή χρήση

Model

	A	B	C	D	E	F	G	H	I	J	K	L
165	RouterBOARD 951G-2HnD (EU)	469A024EF09	SW91-YYWY	D4:CA:6D:19:3C:C4 - D4:CA:6D:19:3C:C9	1164	192.168.1.164	1502	ΔΙΑΘΕΣΙΜΟΣ	PORTO	POE	23	RouterOS Ver 6.11
166	RouterBOARD 951G-2HnD (EU)	469A04F74AB	5CZ1-60BP	4C:5E:0C:22:84:AC - 4C:5E:0C:22:84:B1	1165	192.168.1.165	505	ΔΙΑΘΕΣΙΜΟΣ	PORTO	POE	23	RouterOS Ver 6.11
167	RouterBOARD 951G-2HnD (EU)	469A04B6DA6	12XE-7Y9Z	4C:5E:0C:22:85:90 - 4C:5E:0C:22:85:95	1166	192.168.1.166	507	ΔΙΑΘΕΣΙΜΟΣ	PORTO	POE	23	RouterOS Ver 6.11
168	RouterBOARD 951G-2HnD (EU)	469A0405FD8	D0NR-N0DJ	4C:5E:0C:24:C1:2E - 4C:5E:0C:24:C1:33	1167	192.168.1.167	1509	ΔΙΑΘΕΣΙΜΟΣ	PORTO	POE	22	RouterOS Ver 6.11
169	RouterBOARD 951G-2HnD (EU)	469A0264AF6	XR4D-23FN	D4:CA:6D:E0:C4:BE - D4:CA:6D:E0:C4:C3	1168	192.168.1.168	1512	ΔΙΑΘΕΣΙΜΟΣ	PORTO	POE	22	RouterOS Ver 6.11
170	RouterBOARD 951G-2HnD (EU)	469A029331F3	47WF-A1XY	D4:CA:6D:19:3D:CC - D4:CA:6D:19:3D:D1	1169	192.168.1.169	601	ΔΙΑΘΕΣΙΜΟΣ	PORTO	POE	22	RouterOS Ver 6.11

INSTALLATION PROCEDURE AT SITE

Part 2. Elounda Hotels & Resorts

- In the careful selected installation locations which completed during the system radio coverage measurements, we started the **AP's Installations** at the pre selected Hotel Rooms, with additional care regarding **electrical safety**, **mechanical strength** and proper **visual appearance**.

INSTALLATION PROCEDURE AT SITE

Part 2. Elounda Hotels & Resorts

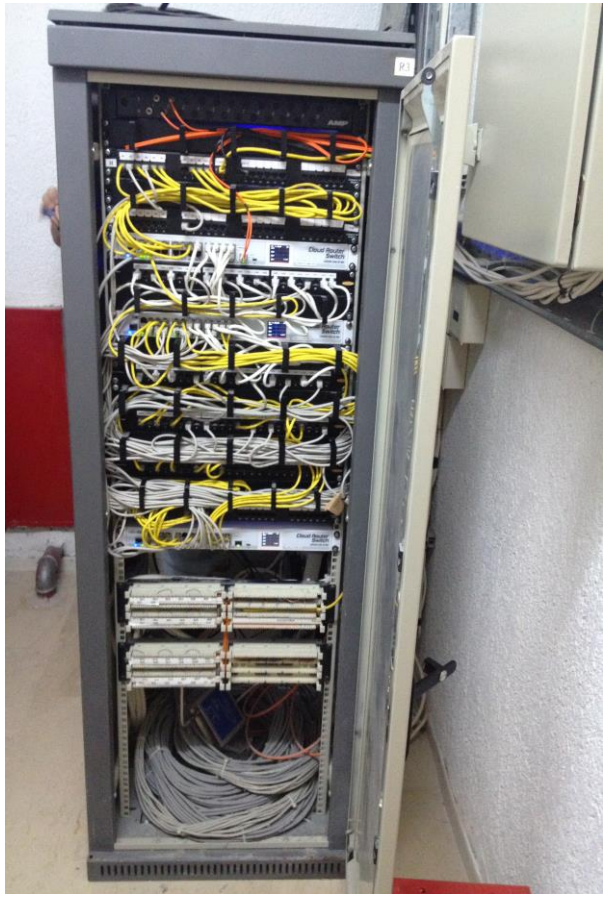
INSTALLATION PROCEDURE AT SITE

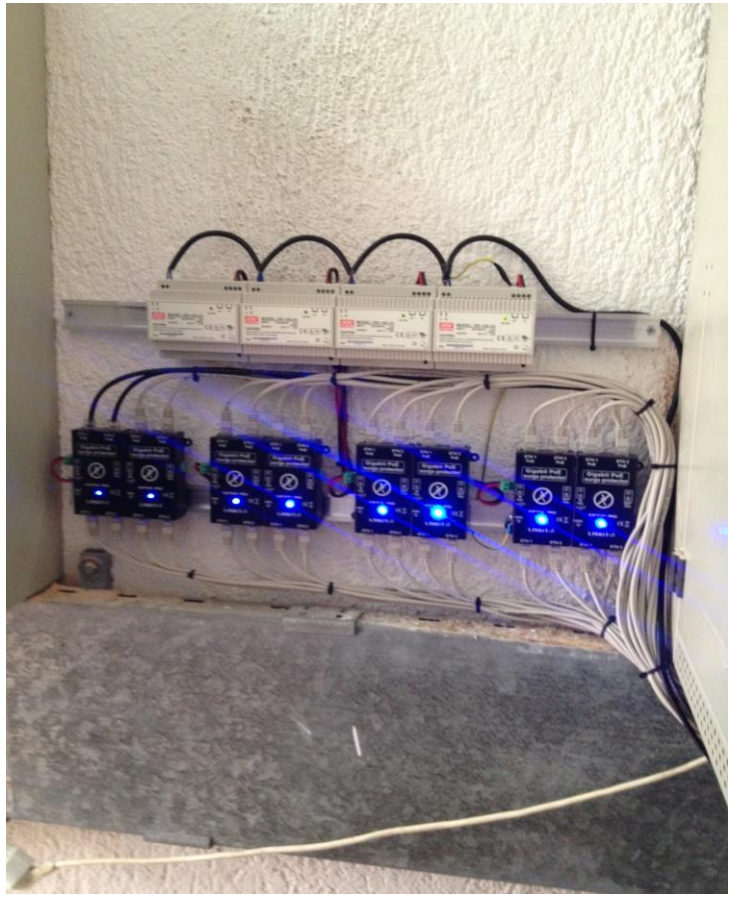
Part 2. Elounda Hotels & Resorts

- The PoE equipments installation at the computer rooms were made easily accessible for support and proper mechanical and visual cabling.

INSTALLATION PROCEDURE AT SITE

Part 2. Elounda Hotels & Resorts

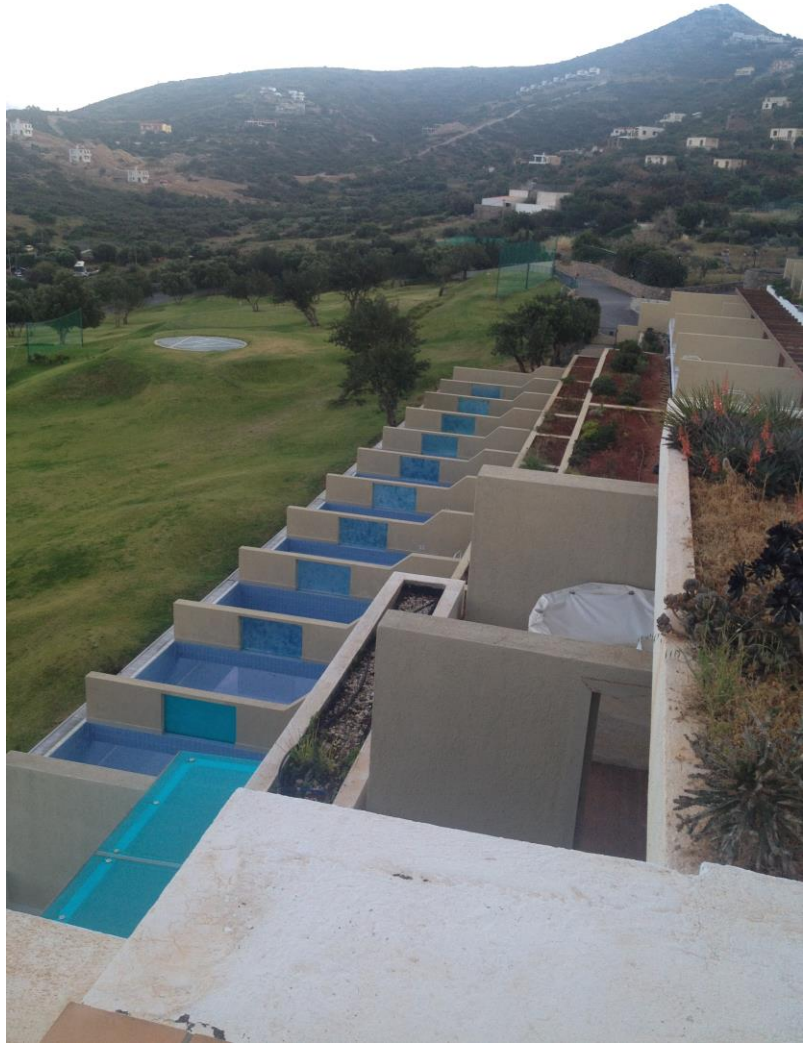




INSTALLATION PROCEDURE AT SITE

Part 2. Elounda Hotels & Resorts

- Outdoor equipment installation was made with very special care regarding **Radio coverage** – **Electrical Installation safety** – as much as possible with **Discrete Visual Appearance**, and with very special care its **Antenna Radiation Lobe to be protected** from near by multiple access points on the same channel!



HOTEL COMPLEX NETWORK BACK BONE IN BRIEF

Part 2. Elounda Hotels & Resorts

SYSTEM OPERATION REQUIREMENTS

Part 2. Elounda Hotels & Resorts

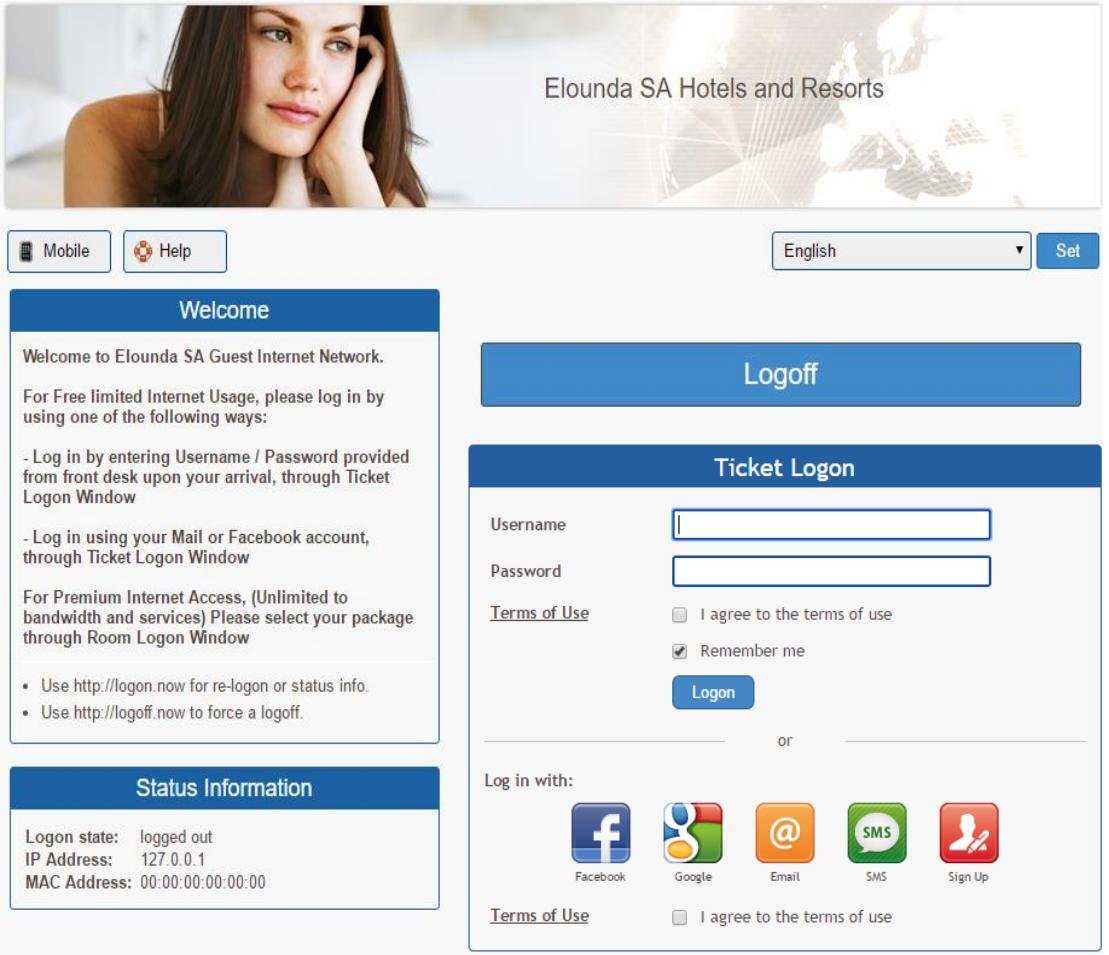
- In such a large scale project environment, it is a must hotel clients to have a very friendly login procedure, through Social networks, with controllable limited FREE usage.

- Most large scale WiFi projects as the present one, require the WiFi system to be fully cooperative with the Hotel Accounting Platform (in the present project **Fidelio Platform)**, as well as the system to provide multi end user selectable connection profiles, and these profiles charges be charged directly on the Hotel accounting system per end user.
  This is a very **demanding procedure** and need careful **cooperation** with the Hotel accounting **Platform** Vendor.
- In the present project **IACBOX** Software covered most of the above requirements and the **following ones:**

SYSTEM OPERATION REQUIREMENTS

Part 2. Elounda Hotels & Resorts

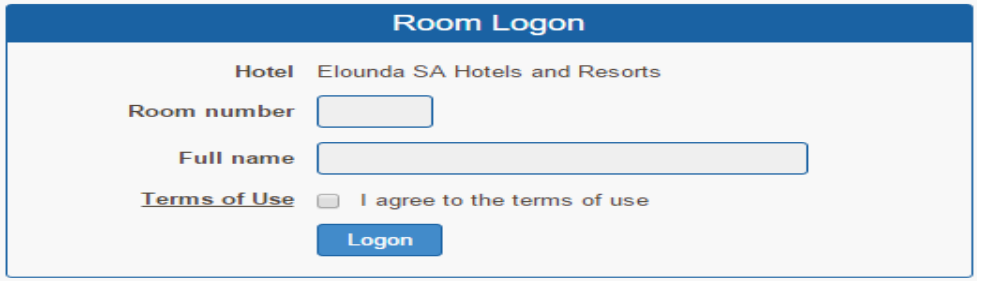
A friendly User Login Software **must Provide**, FREE access login through: **Facebook**, **E-Mail**, or **username and password**.

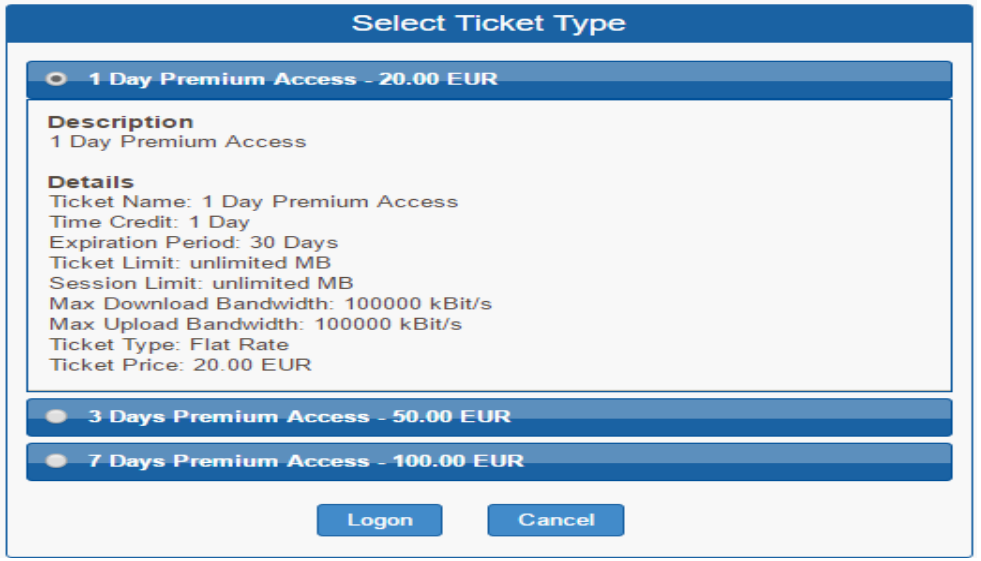


SYSTEM OPERATION REQUIREMENTS

Part 2. Elounda Hotels & Resorts

Or alternative, login capability through the **Fidelio Platform,** where the client's Room will be charged for his selected **connection profile**.





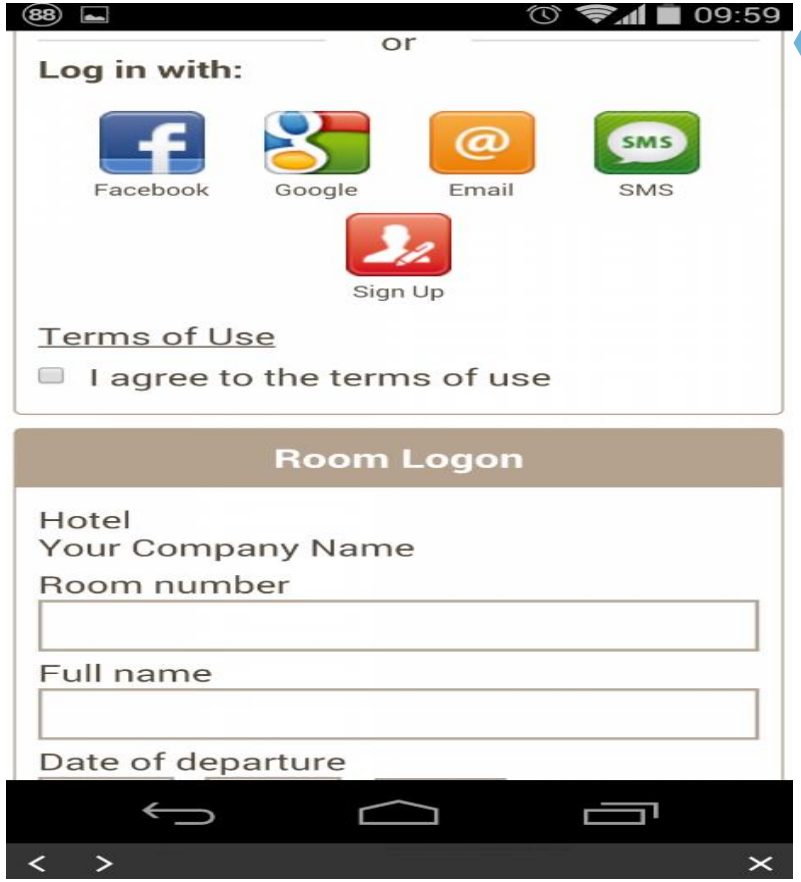
SYSTEM OPERATION REQUIREMENTS

Part 2. Elounda Hotels & Resorts

User-friendly

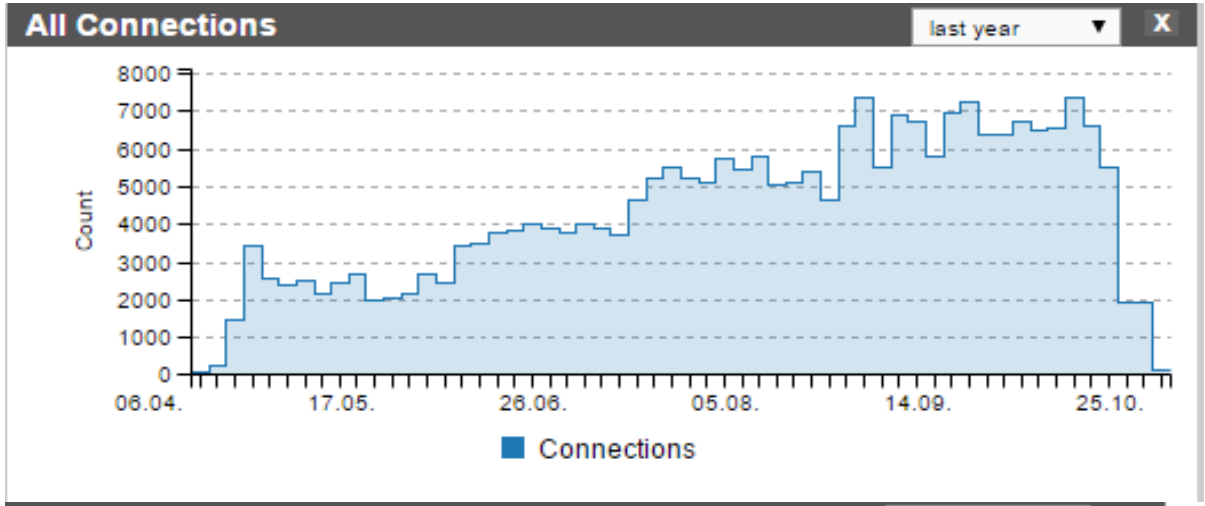
The **customer login page (Captive Portal)** is **multilingual** and recognises the prefered language of the end device automatically. Furthermore the login page provides support for **mobile devices** like Smartphones, Tablets, Notebooks, etc..

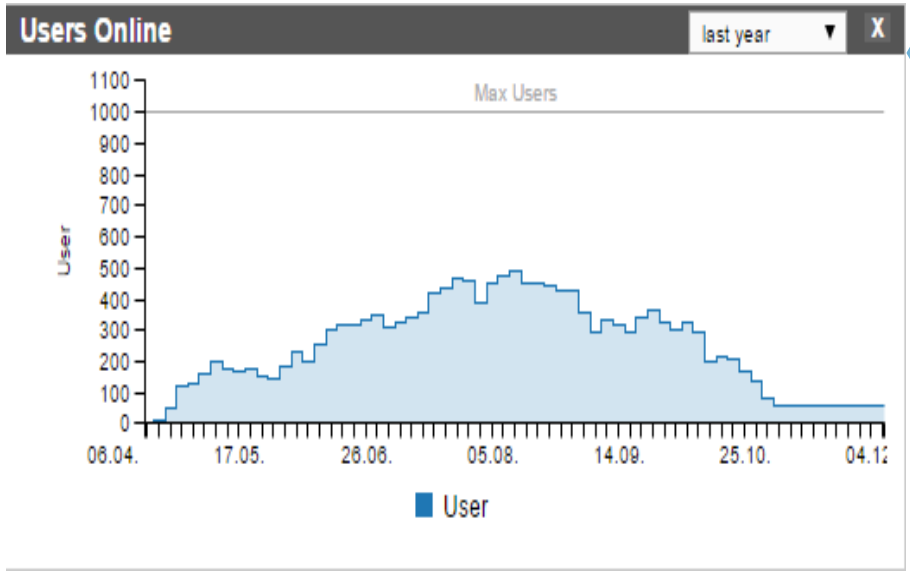
- Customer login page translated into **24 languages** (Arabic, Chinese, Croatian, Czech, Danish, Dutch, English, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Norwegian, Polish, Portuguese, Romanian, Russian, Slovak, Slovenian, Spanish, Swedish, Turkish)
- **Scan & Surf** – smart login by scanning **QR code**
- **Concurrent login** of multiple devices with same login information
- Walled Garden (free available websites to all)
- **Bandwidth management** incl. guaranteed bandwidth per user
- **"Remember Me" feature** for automatic relogin of already registered devices
- Predefined **Terms of Use** for all available languages
- Individual Accounting (time, date, data volume, bandwidth) or free
- **Loyalty program** support (loyalty cards, Hotel membership programs, ...)

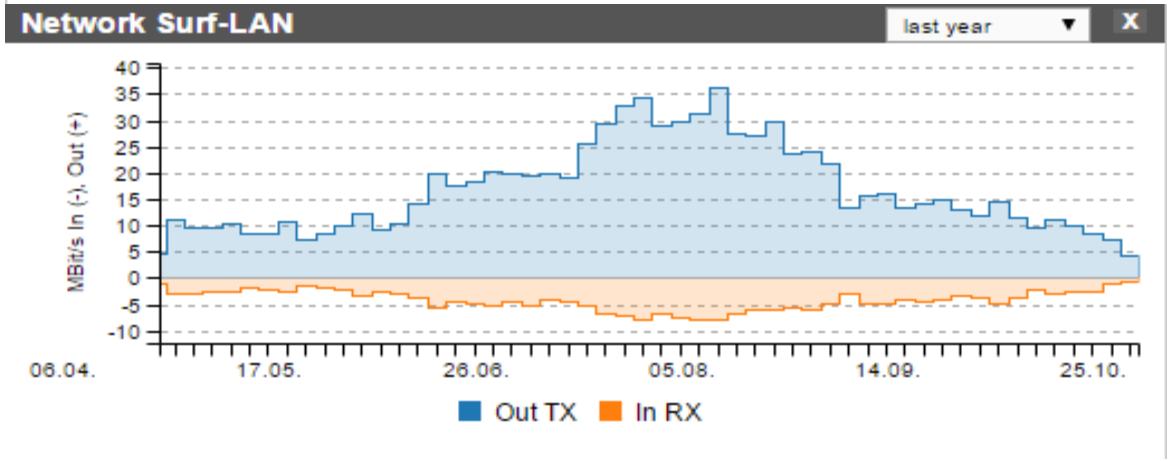


SYSTEM OPERATION REQUIREMENTS

Part 2. Elounda Hotels & Resorts







These are some of the last year Statistics.

SYSTEM OPERATION REQUIREMENTS

Part 2. Elounda Hotels & Resorts

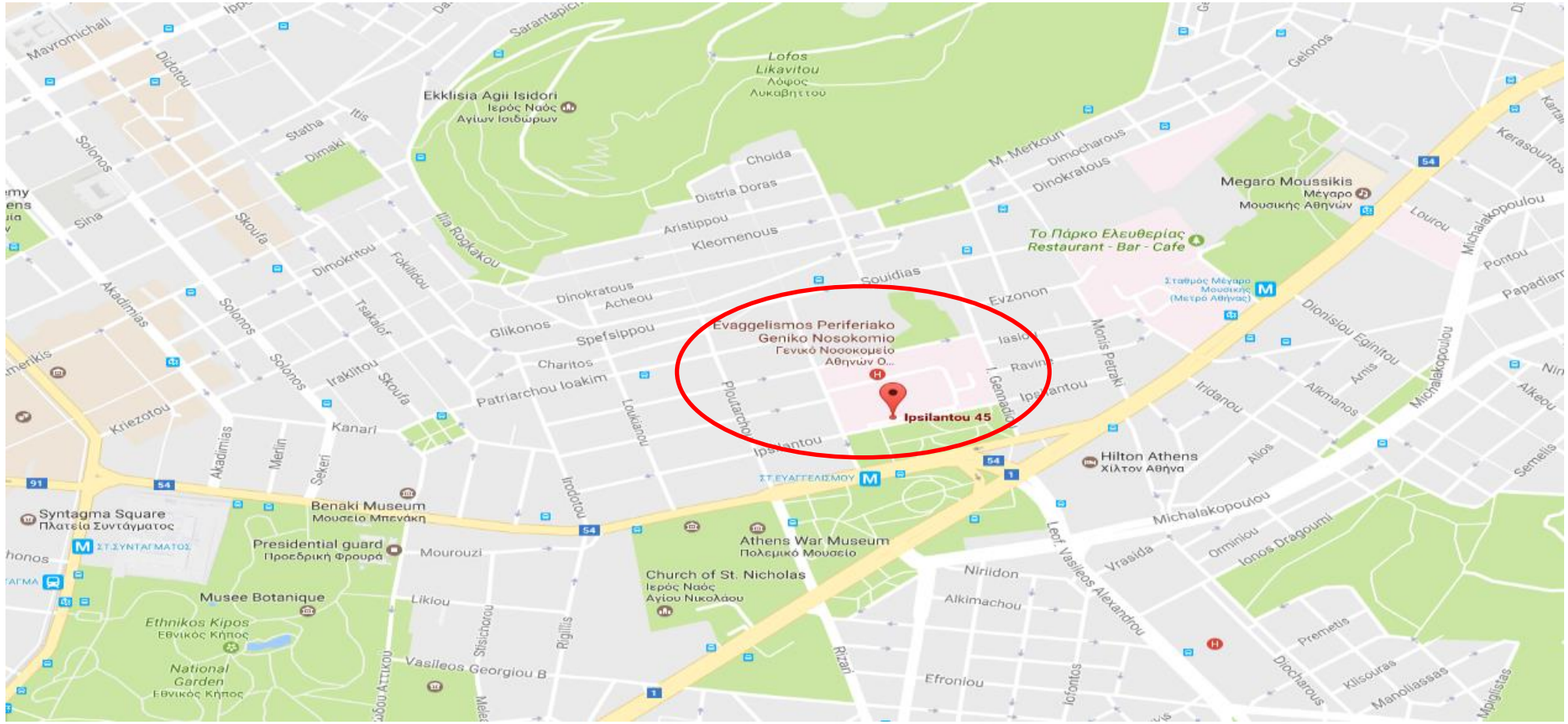
The specific Hotel Project **today operates** with the latest operational and fully tested **RouterOS**.

OUR NEW 2016 LARGE SCALE 200 AP'S WIFI PROJECT

Part 3. At Athens Largest Hellenic General Hospital "Evaggelismos"

LOCATION OF IT:

Part 3. Largest Hellenic General Hospital of Athens “Evaggelismos”



CLIENT'S BASIC REQUIREMENTS FOR THE SPECIFIC PROJECT

Part 3. Largest Hellenic General Hospital of Athens "Evaggelismos"

- **Study for the structured cabling** installation - Routing requirements on this 11 floor hospital.
- Study for the complete WiFi **radio coverage** at selected Hospital Areas.
- **Free login** internet access for patients and visitors.
- **Access to patients files** from authorized **doctors via mobile tablets**.

OUR FIRST VISIT AT PROJECT SITE

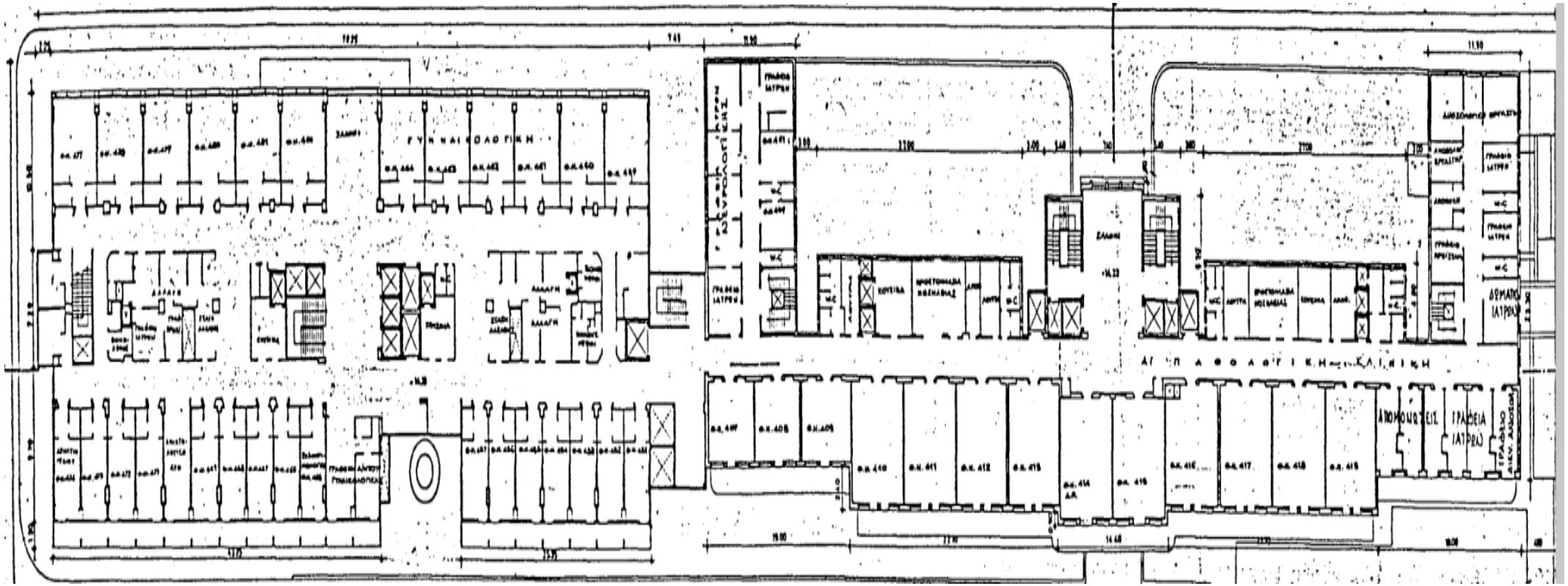
Part 3. Largest Hellenic General Hospital of Athens “Evaggelismos”

- We had a **detailed inspection** visit to all the Hospital **Areas** that were requested be **radio covered**.

- We did a detailed **Software Radio coverage study** based on Hospital Plans and also **live measurements** in order to obtain a full picture of the **existing radio noise** as well as the **penetration losses** through the **Hospital walls** on each floor.

LIVE RADIO COVERAGE AREAS FOR MEASUREMENTS AT HOSPITAL

Part 3. Largest Hellenic General Hospital of Athens “Evaggelismos”



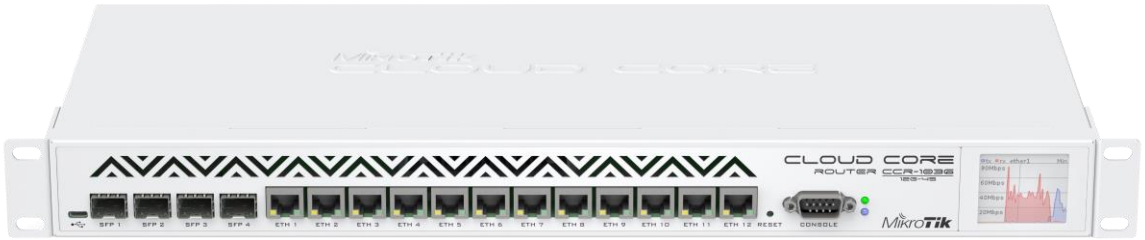
SELECTION OF SYSTEM EQUIPMENTS INSTALLATION LOCATIONS

Part 3. Largest Hellenic General Hospital of Athens “Evaggelismos”

- We selected the **AP’s locations** at the hospital’s corridors on each floor.
- We made the careful selection of the structured **cabling Routes** via the hospital corridors ceilings, please note **hospitals have a lot of restrictions about it.**
- We made the careful selection of the structured cabling **concentration points** Racks -Switches & PoE.

SYSTEM CENTRAL MANAGEMENT MAIN HARDWARE

Part 3. Largest Hellenic General Hospital of Athens “Evaggelismos”



1 pcs

Product specifications

Details	
Product code	CCR1036-12G-4S-EM
SFP DDMI	Yes
CPU nominal frequency	1.2 GHz
CPU core count	36
Size of RAM	16 GB
Architecture	TILE
10/100/1000 Ethernet ports	12
Operating System	RouterOS v6 (64bit)
License level	6
SFP ports	4

SWITCHES

Part 3. Largest Hellenic General Hospital of Athens “Evaggelismos”

15 pcs

Product specifications

Details	
Product code	CRS125-24G-1S-RM
SFP DDMI	Yes
CPU nominal frequency	600 MHz
CPU core count	1
Size of RAM	128 MB
Architecture	MIPS-BE
10/100/1000 Ethernet ports	24
Operating System	RouterOS
License level	5
SFP ports	1

INDOOR ACCESS POINT

Part 3. Largest Hellenic General Hospital of Athens “Evaggelismos”

200 pcs

Product specifications

Details	
Product code	RBwAPG-5HacT2HnD-BE
Wireless standards	802.11a/b/g/n/ac
CPU nominal frequency	720 MHz
CPU core count	1
Size of RAM	64 MB
Architecture	MIPS-BE
10/100/1000 Ethernet ports	1
Operating System	RouterOS
License level	4
Chains	3

INDUSTRIAL PASSIVE POE

Part 3. Largest Hellenic General Hospital of Athens “Evaggelismos”

Product specifications

Details	
Ways	2
LAN Ports	Gigabit Ethernet 10/100/1000
Power Supply	12 … 24V
Overvoltage Protection	Up to 25kV with low capacitive ESD Transil
Discharge Current	Up to 15kA with 4 surge arresters on each port
Operating Temperature	-30°C … +65°C
Mounting	Wall mounting or standard DIN support

INDUSTRIAL POWER SUPPLY

Part 3. Largest Hellenic General Hospital of Athens “Evaggelismos”

Product specifications

Features

- Universal AC input / Full range
- Protections: Short circuit / Overload / Over voltage / Over temperature
- Cooling by free air convection
- Can be installed on DIN rail TS-35/7.5 or 15
- LED indicator for power on
- 100% full load burn-in test
- Fix switching frequency at 100KHz

CAT6E FTP CABLE

Part 3. Largest Hellenic General Hospital of Athens “Evaggelismos”

7500 m

Product specifications

Features

- FTP 4x2x24AWG cat5e
- 500 Meter
- Indoor

RACK 9U

Part 3. Largest Hellenic General Hospital of Athens “Evaggelismos”

15 pcs

Product specifications

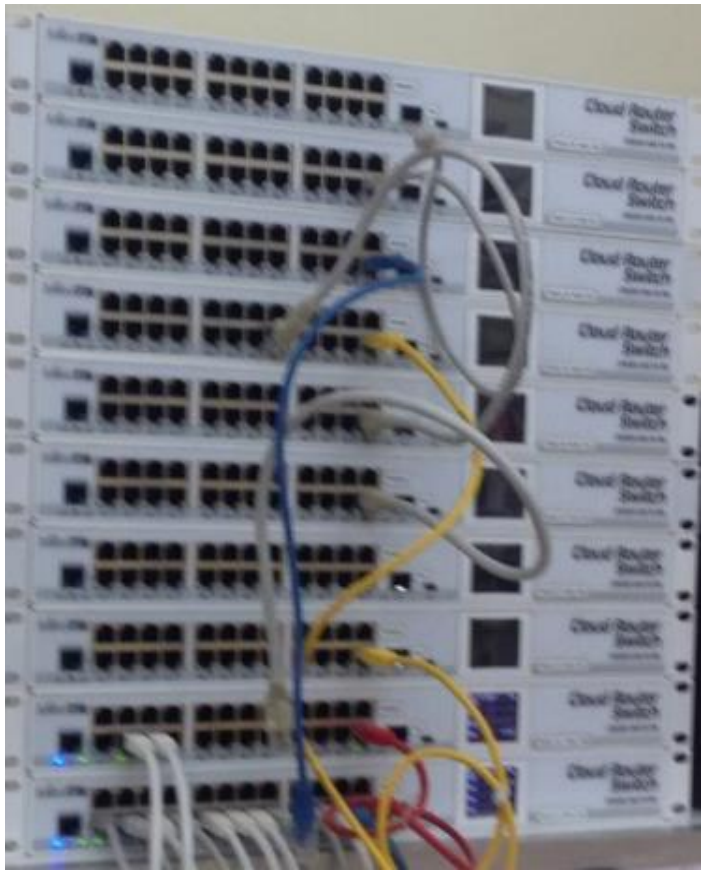
Features

- 9U Wall Mount Rack

EQUIPMENTS INTEGRATION ACCEPTANCE TEST & CONFIGURATION STEPS, AT OUR TECHNICAL DEPARTMENT

Part 3. Largest Hellenic General Hospital of Athens “Evaggelismos”

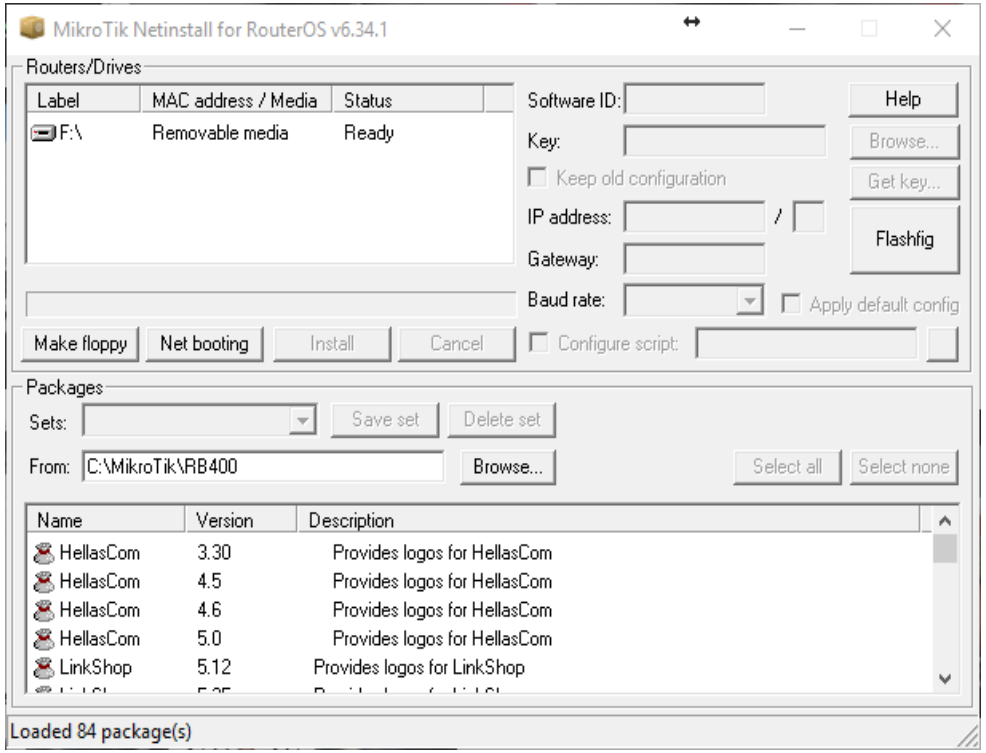
- We **upgraded and tested** all the equipment to version 6.37.1
- All AP’s **configured** in order to be connected with the central **CAPsMAN**.
- We **created configuration backup** – support files for each equipment.



EQUIPMENTS INTEGRATION ACCEPTANCE TEST & CONFIGURATION STEPS, AT OUR TECHNICAL DEPARTMENT

Part 3. Largest Hellenic General Hospital of Athens “Evaggelismos”

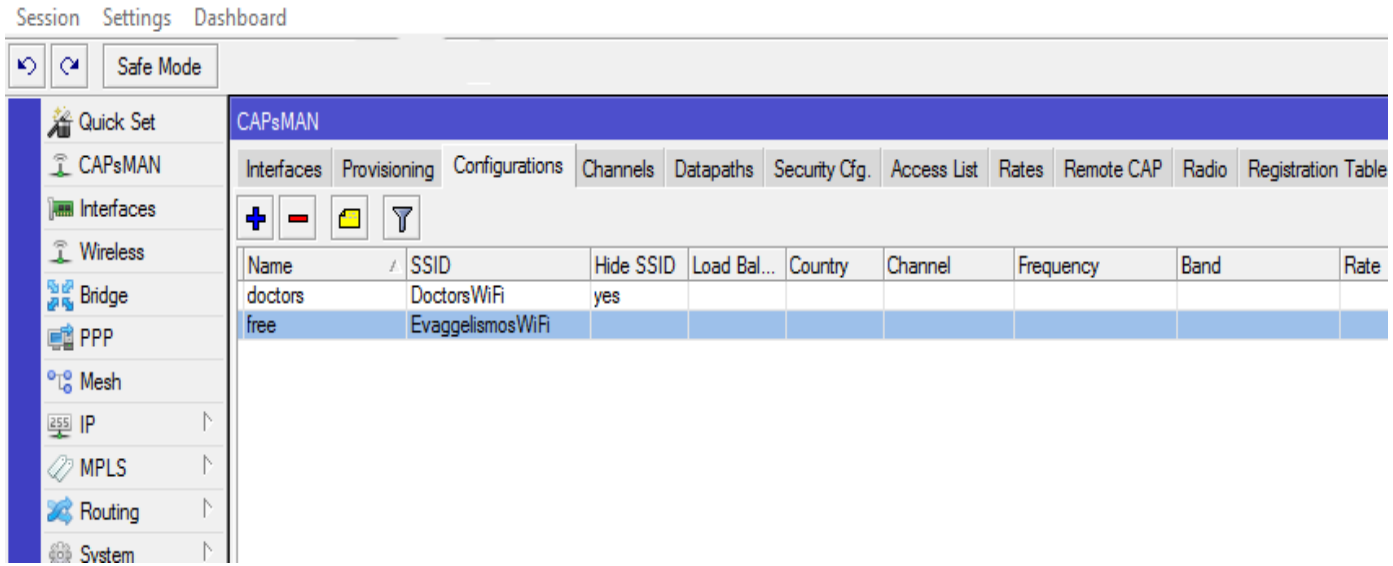
- Equipment configuration through **Netinstall** and **script** use.

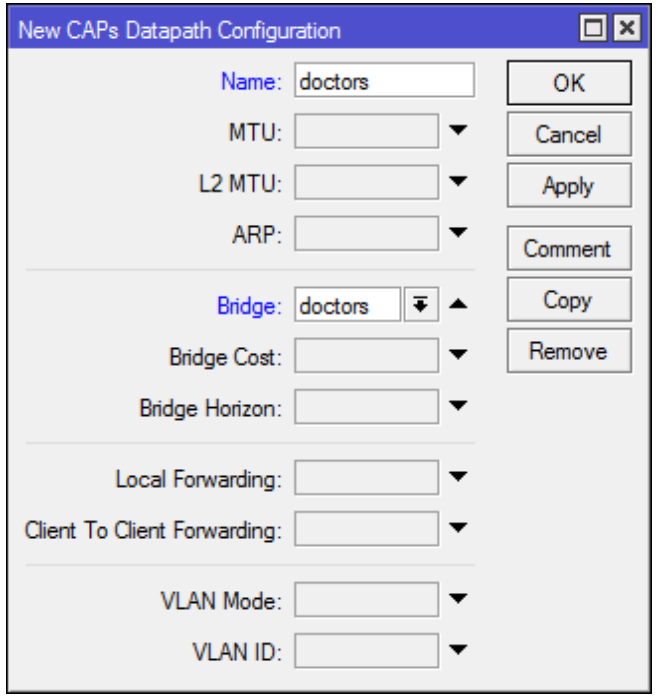


EQUIPMENTS INTEGRATION ACCEPTANCE TEST & CONFIGURATION STEPS, AT OUR TECHNICAL DEPARTMENT

Part 3. Largest Hellenic General Hospital of Athens “Evaggelismos”

- **Main Router** configuration.
- **CAPsMAN activation**.

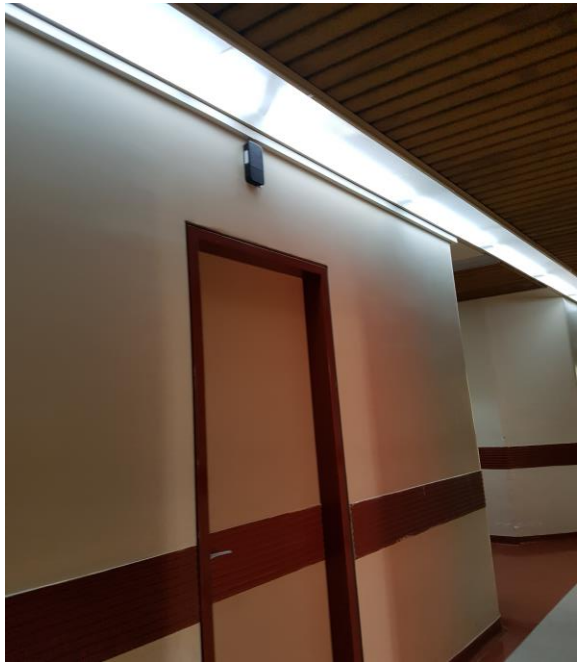




INSTALLATION PROCEDURE AT SITE

Part 3. Largest Hellenic General Hospital of Athens “Evaggelismos”

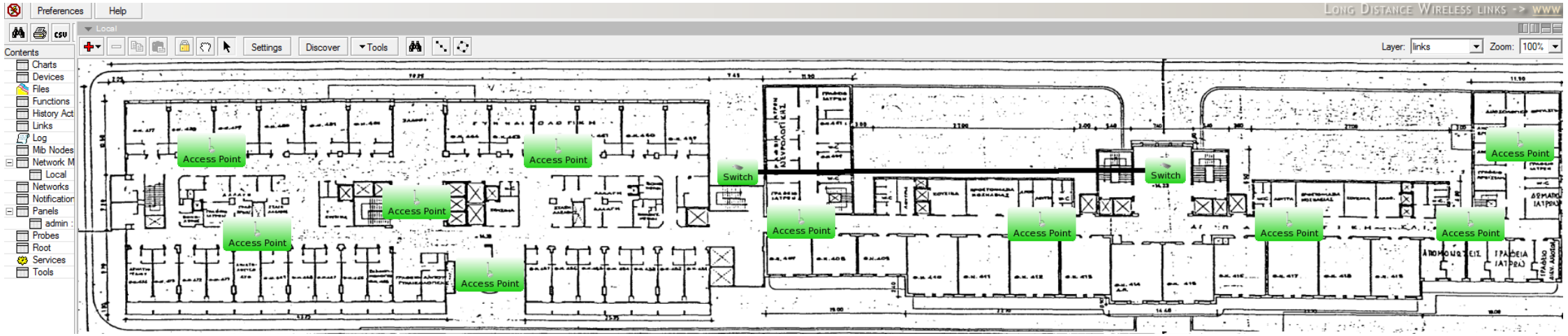
- We had **structured cabling** installation and **testing.**
- And then we made the **AP’s** installation and **testing too**.



INSTALLATION PROCEDURE AT SITE

Part 3. Largest Hellenic General Hospital of Athens “Evaggelismos”

- We designed the proper Graphic environment where the system of every floor was displayed at dude environment display.



The project delivered after extensive Coverage and Bandwidth tests.

Thank you ☺

smarag@hellascom.gr