



# KABTEL

## CASE STUDY

COMMUNICATION / INFRASTRUCTURE / NETWORKING & SECURITY /  
ICT INFRASTRUCTURE / INTELLIGENT BUILDING MANAGEMENT SYSTEMS & AUTOMATION /  
LOW VOLTAGE SYSTEMS & SOLUTIONS



## "A COMPUTER FOR EVERY CHILD" - MINISTRY OF INFORMATION SOCIETY, REPUBLIC OF MACEDONIA



Влада на  
Република Македонија

Situated on the Balkan Peninsula in Southeastern Europe, Republic of Macedonia has thrived as an independent country since the formal recognition in 1993. Its' Ministry of Information (Mol) Society has proactively promoted Information Technology as a means to enrich the country culturally as well as to develop a knowledge-based economy.

In late 2006, the Mol and Macedonian Government embarked on a progressive policy called "A Computer for Every Child", part of the national initiative through 2015 designed to enrich and enlighten the students.

The essential program goals are to increase the quality and quantity of IT based studies in the Republic of Macedonia and to provide access to all students to advanced teaching tools available on the Internet.

## CHALLENGES

- ▶ Cable all Macedonian primary and secondary schools for digital access – "A Computer for every Child".
- ▶ Mix of old and new, pre-existing buildings.
- ▶ LAN and electrical cabling installation must progress smoothly with minimal disruption.
- ▶ WAN/LAN networks between classrooms and schools must perform quickly and reliably.
- ▶ Seriously consider the fact that users are small kids and mainly teenagers so reliability, durability and security of the installed LAN and low-voltage electrical networks must be ultimately done "by the book" following and respecting all existing international standards.

## PRODUCTS AND SERVICES

- ▶ Nexans LANmark-5 shielded copper structured cabling system
- ▶ Legrand DLP plastic cable trucking and accessories
- ▶ Nexans' advisory and support service

## WHY KABTEL?

Speed and efficiency were vital in properly completing each project area with minimal disruption of school activities.

KABTEL won the contract because of its strong regional presence and experience throughout the Balkans including Albania, Kosovo and Serbia, its Nexans Training Centre in Skopje, and some novel attributes of the cable it recommended for the project: a LANmark shielded twisted pair cable.

The highly resilient yet flexible cable became the primary network foundation because its narrow diameter allowed multiple cables to be easily pulled in PVC ducts shared with electric power lines.

## BENEFITS



### TECHNICAL

Computer for Every Child is a project by which Macedonia stands out as the first and only country in the world that enables a use of a computer in the school system for every child and an access for every child to the global Internet network.

For the successful completion of this capital project of the country, KABTEL and NEXANS as exclusive partner of KABTEL were selected in the section of cabling. For the first time in Macedonia, KABTEL in cooperation with NEXANS installed LANmark- 5 cabling system.

- ▶ Narrow, flexible cable easily pulled through ducts.
- ▶ Ideal for use in wide range of existing construction – old and new.
- ▶ Shielded cable construction greatly reduces crosstalk; EMI.
- ▶ Allows communications and power lines to share single duct for cost savings.
- ▶ Supports WAN/LAN architecture with no signal loss.

Total length of 261.000 meters of LANmark-5 F<sup>2</sup>TP LSZH cable. The total number of installed links was 15.724 in the first phase in secondary schools, which was successfully completed in 2008. Kabtel managed to get a second contract for the project "Computer for Every Child" cabling for 365 primary schools nationwide, including about 5.000 classrooms. A third contract was also signed with the Ministry of Education for 213 local primary schools, including about 830 classrooms.



### FINANCIAL

Thanks to the introduction of LANmark- 5 cabling system, Ministry of Information Society has reduced its operational cost by 30%.



### USER EXPERIENCE

It first facilitates one-on-one computer instruction, there by raising the number of students actively participating in the educational process.

As a result, there will be equal opportunities for all students regardless the school's location, and equal treatment of every student, regardless where they sit in the classroom.



**ПРОФЕСИОНАЛНОСТ,  
ГРИЖЛИВОСТ И ПОСВЕТЕНОСТ,  
ИСТРАЖНОСТ И ЕФИКАСНОСТ,  
БРЗА И ТОЧНА ДИЈАГНОЗА**

**– карактеристики на  
нашето работење...**

## SRCE - Center for internal diseases



Center for internal diseases “Srce” is a private health institution established in 2003. The center carries out specialist diagnostic examinations. They include detailed examinations when your general practitioner (or another specialist) has established a broad cause of your problems. Patients with problems, which could not have been explained elsewhere, are often referred to “Srce”, and targeted examinations are applied in order to establish the final diagnosis.

The center is specialized in diagnostics and treatment of cardiovascular diseases, rheumatological consultations, urology treatment, peripheral vascular disease, endocrinology consultations, treatment of thyroid disorders and gastroenterology.

## CHALLENGES

➤ Today, the technology is changing the landscape of the world and leading us towards a sophisticated technical world. The emerging role of ICT has created a huge impact on Healthcare. It enhances the quality of care, increases the patient security and data protection and reduces operating & administrative cost. In this Digital era, people can easily seek, access, learn & communicate with others within a quick span of time. Health education creates awareness among the public about the communicable diseases, health status, prevention measures and various current diagnostic & therapeutic procedures. This gives a freedom to the people to choose the best hospitals and doctors to approach for treatment and to have their life in a healthy way.

## PRODUCTS AND SERVICES

In the healthcare organization Srce, Kabtel implemented an integrated solution, under the turn-key principle, which includes:

- System HIQ office (automatic control and management of lighting and air-conditioning),
- High-voltage electric installations,
- Design and instalation of LAN network
- Instalation and configuration of WiFi network,
- Instalation and configuration of PBX telephone exchange,
- Wireless Management System,
- Instalation and configuration of storage,
- Instalation and configuration of server,
- Design and implementation of firewall,
- Design and instalation of video surveillance system,
- Design and implementation of panic lighting,

- Instalation of fire alarm system,
- System for access control and recording business hours
- Alarm Control System.

## WHY KABTEL

➤ In the last few years, there has been an exponential increase in the capacity and capabilities of new technologies that encourage the possibility of a very different model of health care. Kabtel follows the trends and in cooperation with our partners in various activities, we are implementing technologies that can help achieve the necessary changes. The implementation of Kabtel’s integrated solution on a wide range of services for healthcare organizations, will provide personalized care for patients at the highest level, minimizing the costs for healthcare organizations. Kabtel helps the hospital management to lead the organization in a successful way and to overcome the challenges and helps the health instituions to improve the patient safety and satisfaction and get updated to the latest technology. Through Kabtel ICT team, the traditional healthcare systems can be eliminated and new models can be formed for effective quality care.

## BENEFITS

- Greater patient care
- Improved public health
- Ease of workflow
- Lower healthcare costs
- Better and safer data storage
- Improved data access
- Centralized data point
- Improving quality of life
- Reducing healthcare waste
- Improving efficiency and quality of care
- Improved efficiency, leading to savings
- Possibility to carry on brand new health models...







# METROPOL LAKE RESORT



Located in Macedonia, seven kilometers south of Ohrid, Metropol Lake Resort's beautiful setting features 3 hotels, Metropol, Bellevue and Tourist, 800 meters of beach frontage, landscaped gardens and pine woods, and fantastic views overlooking the lake and the surrounding National Park Galicica. The 370 guest rooms and suites, spread across three interlinked buildings, are the largest guest rooms facilities in Ohrid and the region. Designed by acclaimed designers, all interiors have a warm, inviting ambiance. The property also features outdoor swimming pool, lake beach and a host of other lake and land-based activities. From the very beginning at 1975 Metropol Lake Resort has grown and developed by adapting to changing lifestyles. Its new facilities signal a new phase in Metropol Lake Resort history and reaffirm its aim to be a standard of reference within hotels in the region.

## CHALLENGES

➤ There is one upgrade that can dramatically increase business and make your customer satisfaction soar – free and reliable WiFi. After all, your goal is to give the people what they want, and the people want WiFi. WiFi is extremely important to travelers. Over 90% of business & leisure travelers want WiFi access in their rooms, while a third stated they would not return to a hotel that did not meet this expectation. Poor quality internet service could translate into a painful loss of business.

## PRODUCT AND SERVICES

➤ Implemented EnGenius wireless networking solution (EWS330AP / ENS660AP / EWS2910P / EWS7928P) covering all three hotels in the complex - Metropol, Bellevue and Tourist as well as their associated contents, in order to provide maximum comfort to the guests staying in the complex. The EnGenius Indoor&Outdoor Wireless Access Points and ezMaster™ network management software were used to remotely monitor, manage and troubleshoot making centralized network management easy.

## WHY EnGenius SOLUTION?

➤ EnGenius is a leading brand of Senao Networks, a networking expert in wireless communications and radio (RF) technology. The company maintains high control standards over its products to ensure customers enjoy top performing solutions with enhanced features at an unmatched value. The company features a complete product line for all wireless environments which includes network servers, security products, wireless mesh networking for digital wireless network cities and to end-user wireless network products.



## WHY KABTEL

➤ Kabel deliver a secure, performant and agile IT infrastructure. An infrastructure must be designed to flex and scale as business needs change, while at the same time being secure and easy to manage. Kabel's specializes in the design and delivery of solutions, from the network including Local (LAN), Wide (WAN) and Wireless (WiFi) through to the applications and compute infrastructure whether onsite, on-premise or in the cloud.

## BENEFITS

- Affordable WiFi solution
- Raises Staff Efficiency
- Easy installation, set up & analytics
- Low-Cost Management
- Reduced Total Cost of Ownership (TCO)
- Performance
- Extended Connectivity
- Scalability
- Mobility
- Enhanced brand image
- Secure Guest Access
- Outdoor Wireless Mesh Networking
- Advanced Security Feature
- Superior signal strength
- Technical Support
- Improved guest experience
- Promotes Customer Loyalty
- Enhances Guests Browsing Experience
- Strengthens the bond between hotel&guests
- Increase of bookings

## USER EXPERIENCE

By deploying the EzMaster we got a single point of view of the entire WiFi network, which saves time and resources in maintaining and keeping the customer's satisfaction".

Filip Mishevski,  
General Manager of Metropol Lake Resort



# CERTIADRIA

Opening future through knowledge  
and certification.

[www.certiadria.com](http://www.certiadria.com)

## CERTIADRIA

CERTIADRIA

Certiadria is international education and certification company, established and based in Adriatic region, working in the following ten countries: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Kosovo, Malta, Macedonia, Montenegro, Serbia and Slovenia. Certiadria is committed on providing educational and certification services in the Adriatic region for global professional impact and builds strong connections between academic and industry world. What differentiates and gives unique value to Certiadria are the partnerships established with the world's leaders in publishing and certification.

## CHALLENGES

► Fully integrated turnkey based solution for increased efficiency and cost optimization

Video surveillance system – This system is needed for 24 hour technical security of the facility. Greater security and protection of the facility.

Fire alert system- Timely alert and early detection of fire in the facility, based on smoke sensors, heat and smoke sensors, conventional and addressable fire alarm systems for safe evacuation of students and staff.

Alarm Unit System- Alarm systems are designed to detect unauthorized access to a particular facility or premises. When the system is activated through the detection devices, it detects an unusual situation and immediately switches on the sirens or alerts the authorized security agency.

Wireless connection systems – Uninterrupted WiFi connection throughout the facility and access to both the Internet and the resources within the internal network. WiFi creates opportunities for mobility, initiative and innovation, especially demonstrated by the educational applications.

## PRODUCTS AND SERVICES

► Video surveillance system- Installation, implementation, set-up and commissioning of a complete video surveillance system with IP cameras for the technical security of the facility.

► Fire Alarm System - According to the needs of the facility and project, conventional six-zoned units has been installed. The following elements of an early fire detection system have been installed: conventional optical fire detectors, conventional thermal detectors, conventional manual fire alarm and conventional fire alarm siren. Full integration and implementation of the fire alarm system.

► Alarm Control System - An alarm system is installed which consists of PIR detectors for

movement detection, sirens foreexternal and internal installation. The entire system connection is in the alarm unit, via additional modules for connecting the PIR detectors. The system is controlled via LCD monitor, display of alphanumeric messages and symbols, programmable function keys, 4 signal LED lights.

► Wireless connection system - The complete solution is based on EnGenius controlled wireless systems where all access points are connected in a single system, allowing uninterrupted roaming of users within the facility, as well as monitoring and managing the entire wireless network from one central location.

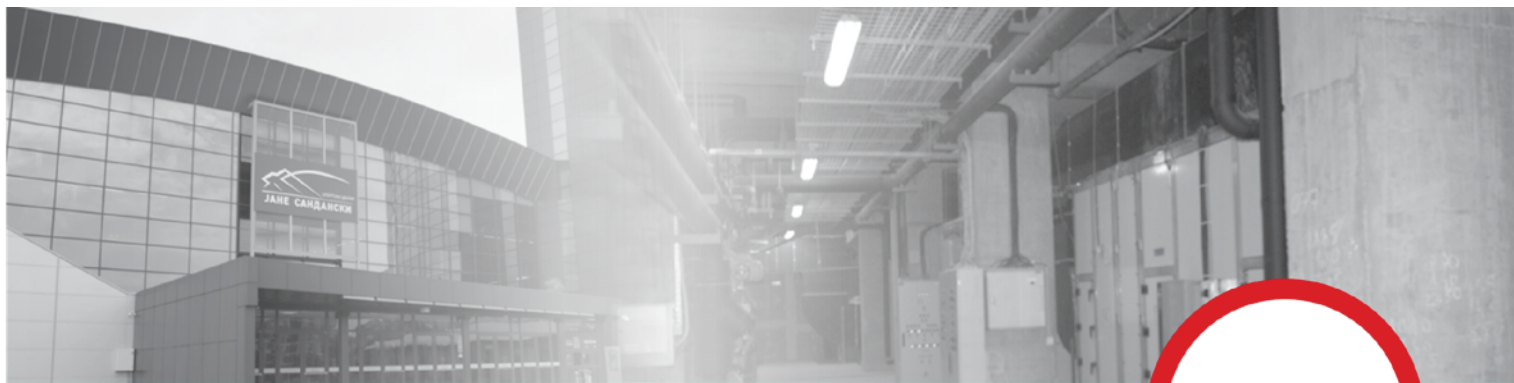
## WHY KABTEL?

► At Kabtel, we are dedicated to providing educational institutions with technologies that support staff and students with improving educational outcomes. By partnering with Kabtel, we ensure your facility meets the standards of a 21st-century learning environment. We specialize in solutions for all levels, from fire alarms and security systems to wireless networks, so we can tailor each system based on your organization's particular needs. Our team is here to craft technology solutions that not only fit your budget while delivering the safety, security and learning tools your organization needs. We provide the solutions that help improve safety, increase efficiency and reduce cost.

## BENEFITS

- Quick problem detection
- Facility security and protection
- Timely prevention of undesired events
- Reduction in the number of defects
- Safe evacuation of people
- Simplified network monitoring and control
- Modern educational processes
- Compliance with legislation and standards
- Guarantee
- Support





# SPORT CENTER "JANE SANDANSKI"



"Jane Sandanski" Sports Center is a multifunctional facility which contains a large sports arena with a capacity of 6.500 visitors, a small sports hall with a capacity of 1.000 visitors, a conference room, tennis courts, fitness and aerobics center, a playground and sports equipment storage and a fans shop HUMMEL Vardar.

The Sports Arena has a capacity of 6.500 visitors, made according to the standards for any international competition in basketball and handball. The Sports Arena is the first arena with three children's areas with 40 seats, four fans zones, and seven VIP rooms.

Within the sports center there is a smaller gym, which is mainly used for trainings and sport activities for basketball, volleyball, handball, indoor football, etc ... with a capacity of 1.000 seats.

S.C. "Jane Sandanski" has a conference room where press conferences and different events of this type are held.

## CHALLENGES

- ▶ To integrate disparate HVAC control systems into a centralized facility management system;
- ▶ To begin a process of building integration into the facility management system;
- ▶ To design & Build a control system with a maximum efficiency thus to reduce energy costs;
- ▶ To standardize on a common platform;
- ▶ Policy for using open standards to achieve competitive price;
- ▶ Flexibility for incremental retrofits.

## PRODUCTS AND SERVICES

- ▶ SAUTER Intelligent Control of machinery control board:
  - On/Off controllers (Thermostats, Frost monitors, Pressure switches)
  - Sensors and transducers (Temperature, Flow, VAV, Differential pressure, Air quality)
  - Electric drives, control valves, butterfly valves
  - Distribution boards for the logic
  - Management level software (novaPro Open Suite)
  - System integration (communication module with M-Bus and EIA – 232 interfaces)

## WHY KABTEL?

KABTEL with SAUTER building automation links all systems and optimizes their interaction with a maximum energy efficiency. It automatically determines (for example, using presence detectors and sensors) the real requirements for heating, cooling, fresh air and provides the right amount of energy, at the right time, and on the right location. This type of needs-based building automation system prevents energy waste and results in a noticeable and worthwhile reduction in operating costs with swift repayment.

Modular components complete SAUTER's building automation for integrated solutions enable special applications:

- ▶ MODBUS: machinery plant
- ▶ M-Bus: meters (heat, electricity, gas, water, etc.)
- ▶ BACNet: Building Automation and Control Networks
- ▶ VFC Voltage Free Contact, signalization with other systems (fire protection, ventilation, ...)

## BENEFITS



### TEHNICAL

The contract was offered to SAUTER due to its extensive know-how in the technical building management sector, as well as its proven experience in other, similar projects. SAUTER has been responsible for the management of the Jane Sandanski arena since 30.08.2014.

The services provided by SAUTER for the premises include, in particular, the technical building management, maintenance, inspection and servicing of the building, also the monitoring of the warranties. They also cover fire protection and safety technology. In case of a fire emergency all ventilation systems prevent the fire to be spread inside the space of the arena.

There are a lot of technical benefits which make this system easy and efficient.

- ▶ This system is one of the most energy efficient systems in the country. It manages to produce and accumulate energy in the water-thermal accumulators, during the low cost tariff from the grid, and supplies with energy all consumers systems whenever needed, which contributes to a high level of reduction of costs per kWh.
- ▶ The SAUTER building management system incorporates 21 BAC-Net controllers monitoring and/or controlling more than 1.400 spots, which helps SC Jane Sandanski staff to be more proactive and efficient.
- ▶ The WEBs system is accessible anywhere where authorized staff has the use of a computer with Internet access.
- ▶ It also helps the staff to quickly determine the status of all systems and to react accordingly.
- ▶ The automation of the HVAC system helps to sustain the air quality needed inside the arena, making it more pleasant for the audience during any kind of event.
- ▶ In case of a fire emergency it reacts automatically closing the protection lids in ventilation systems preventing smoke spreading. It also starts the fans which draw the smoke out.



### FINANCIAL

As a benefit of the integration of the new BMS system, the global costs of SC Jane Sandanski have largely been reduced. The electrical bills are at minimum using the supply from the grid at night when the electricity tariff fee is at low cost.



### USER EXPERIENCE

The employees are indeed an important success factor for a smooth operation of the Jane Sandanski arena. Because the arena accommodates, in a tightly scheduled succession, many events of various types and different requirements, it continuously needs adequate staff for the facility management. This requires a high availability more or less around the clock – a challenge that KABTEL can master owing to its extensive experience and intelligent planning.







# MACEDONIAN PHILHARMONY, Skopje



After 73 years of existence, the Macedonian Philharmonic got its own home. A new music sanctuary that will start writing a new history of the oldest national music institution in the country. The modern concert hall, built according to globally recognized standards, is an example of how the space intended for the symphony orchestra, representing the symphonic works on the Macedonian music scene, should look and function.

## CHALLENGES

► Building management systems are a vital component to any facility. It is an infrastructure control system that is installed with the aim to make secure and reliable buildings. The system allows for centralized management of infrastructure equipment through an integrated computer-based application (BMS software) and ensures operations are being run efficiently and securely. It gives access to control and monitor activities such as ventilation, heating, lighting, power control, fire and security systems, lifts/elevators, plumbing systems, etc.

## PRODUCT AND SERVICES

► A Building Management System- a central supervision, management and automatic control system- is designed and installed in the building, and uses the BMS software package, with the help of the novaPro Open software package. The project also covers the underfloor heating management. The system is connected to the central communications system, managed via a central computer, which is decentralized with the option to control it both manually and locally. The entire system is graphically displayed on the central computer, including all the parameters that are necessary for the operation of each of the systems, with the possibility to adjust them individually. The priorities of operators with different access levels are defined on the central computer. All measurements, including all discrete signals, as well as the signals used for adjustment are displayed visually, while the alarms and warnings are recorded in a database. It is necessary to confirm the alarms so that the system could return to automatic operation (if the alarm status is removed). Basic and application programs for system operation have been installed. The system has the following tasks:

- Automatic recording, monitoring, and control of work processes
- Collection of all important parameters and states (temperature, pressure, and humidity measurement, display of active consumers, alarms, display of working hours of individual elements ...)
- Early warning for necessary equipment maintenance
- Predefined limit values
- Automated time management to save energy
- Central selection of cooling or heating modes
- Ability to store data

## WHY KABTEL?

► Our understanding of, and ability to work with, both the mechanical and control systems allow us to view your facility's environmental systems as one cohesive system. By looking at the related systems together, we are able to ensure that all components are working together in the most energy-efficient manner to provide building comfort increase, and decrease costs. We believe that the quality of service along with a sincere interest in the customer's satisfaction are absolutely essential for a long-term partnering. We have employed expertise in a number of BMS Systems including Sauter, Robotina, Cybrotech, Trend Controls, etc..."

## BENEFITS

- Energy efficiency & reduced labor  
Real-time view into systems and data analysis allows immediate detection of errors and exceeding the parameters important for facility operation
- Ease of information availability
- Generating a database for system operation that is necessary for techno - economic analyses
- Effective use of maintenance staff
- Early detection of problems
- Reduced risk
- Intelligent reporting
- More satisfied users and visitors
- Safety and security







секаде заедно  
Telekom Slovenia Group



## RADIO ACCESS NETWORK MODERNIZATION PROJECTS



### HUAWEI VENDOR

Huawei is one of the leading telecom vendors in the world. With comprehensive strengths in wireline, wireless and IP technologies, Huawei has gained a leading position in the All-IP convergence age. Their products and solutions have been deployed in over 100 countries and have served 45 of the world's top 50 telecom operators, as well as one third of the world's population.

### MOBILE OPERATORS

- Makedonski Telekom is part of Deutsche Telekom Group through the controlling owner Magyar Telekom since 2001.
- ONE is a member of Telekom Slovenia Group.

### CHALLENGES

Mobile data boom is creating a massive pressure on networks, which has to meet the demands of an increasing number and variety of mobile devices. Networks need to constantly adapt to changing consumers' habits, evolving landscapes and hotspot areas.

Legacy network devices and architecture are barely able to meet the requirements. It is therefore an imperative to modernize legacy mobile networks for a high profitability and a sustainable development.

Today, operators usually expect variety of benefits including more efficient use of spectrum, more efficient shared use of hardware, simpler network architecture, end-to-end security, simplified fully IP-based transport, easy upgrades of existing sites.

### PRODUCTS AND SERVICES

- Preparation of technical documentation: Site Survey Report for BTS equipment, Site Survey Report for MW equipment, Hardware Quality Check List, Huawei-BTS/NodeB Swap Completion Report, MW Verification Report
- Installation, USB and Lap top Commissioning (Using BTSM

and LMT) and Maintenance of 2G and 3G: Outdoor BTS 3900A, Indoor BTS 3900 and 3900L, 2G Micro BTS 3900E and 3G Micro BTS 3900C, DBS 3900

- MW equipment installation (RTN 905, RTN 910, RTN 950, ODU, Antenna)
- RTN 905/910/950 Commissioning using Web LCT
- VSWR and DTF VSWR Measurements using Anritsu Site Master

### WHY KABTEL?

Kabtel has been in a partnership relationship with Huawei for 5 years. In the past period Kabtel's Supplier Performance Evaluation result was permanently assessed with Grade A.

Kabtel worked with Huawei on the implementation of two large and complex projects in the Republic of Macedonia in modernization of the network of two major operators T-Mobile and ONE, installation and commissioning of more than 300 BTS, 100 LTE eNodeB, 100 MW links. All project activities (installations, swaps and new rollouts) had always been delivered on time.

The specialists of Kabtel ICT have a deep sense of development and suggest new and advanced solutions. More than 10 certified electrical engineers work in Kabtel in telecommunications and more than thirty certified technicians hold certificates for working at heights.

Kabtel possesses its own fleet of five modern and specially equipped 4WDs to access any field as well as two trucks, one of them equipped with HIAB for handling and transport of various types of equipment. Our teams are fully equipped with work & safety equipment & tools which are required for performing the most complex telecommunication operations in the field under any kind of weather conditions. Clients' satisfaction is always our top priority.





# MEPSO



MEPSO (Electricity Transmission System Operator of Macedonia) is a company fully state-owned, established in 2005 after the transformation of the Electric Power Company of Macedonia.

The two key MEPSO functions are the electricity transmission and power control.

MEPSO is responsible for electricity transmission on regular basis from the Macedonian border to the EVN ESM distribution grid, or to the listed big industrial consumers. MEPSO arranges and dispatches the electricity transport throughout Macedonia, as well as takes care of balancing the power system.

## CHALLENGES

MEPSO wanted a new protection for its mail server in order to be sure it could efficiently communicate with its corporate partners. Moreover, IT managers needed an all-encompassing tool to provide a better monitoring of the security statuses for all clients. While the previous solution generated alerts whenever a computer was infected with malware, it did not provide a comprehensive overview.

The core MEPSO activity is a smooth electricity transmission via the high voltage network, electric power system control and regular and duly electricity flow to its clients such as the large industrial consumers and to the low voltage grid of EVN Macedonia. Yet cyber-attacks on its IT infrastructure can abruptly bring the production and logistics to a halt. MEPSO has long used anti-virus software to protect its workstations and servers; however, the previous security solution could not keep up with the growing demands of its IT administration.

The company therefore sought a comprehensive protection plan for its fleet of workstations and servers. Windows 7 was installed on 10% of the computers to allow programs compatible only with this operating system to be used, with the remaining 90% running on Windows 8.1.

## PRODUCTS AND SERVICES

- Kaspersky Endpoint Security Select

## WHY KABTEL?

The breadth and depth of the technical staff of Kabtel when it comes to IT security solution is at the highest possible level.

Kaspersky Endpoint Security Select combines anti-malware technology, endpoint controls and data encryption into one single application for Windows workstations. In addition, the Kaspersky

solution offers malware protection, a firewall and a host-based intrusion prevention system for Windows file servers. All functions are centrally administered from the Kaspersky Security Center.

Having the security solution integrated into Kaspersky Security Center in particular is a huge gain for the MEPSO. Through this interface, IT administrators have a control over all Kaspersky applications used within the network.

## BENEFITS



### TECHNICAL

Kaspersky Endpoint Security has been in operation at MEPSO since 2011. The software was implemented entirely by the firm's IT managers alone in just three days. The test phase saw the IT security installed and configured for the server environment and the procedures tested and modified. The software was then rolled out on the servers and computers using the firm's own software distribution system.



### FINANCIAL

Since 2011, MEPSO has been using Kaspersky Endpoint Security 10 for Windows to protect 500 workstations, 15 hardware servers and around 50 virtual servers. MEPSO sought an anti-virus solution to protect our workstations and one that also made the administration easier.



### USER EXPERIENCE

Since the implementation, MEPSO has not experienced a single case of malware, therefore it could be said that Kaspersky Endpoint Security provides virus protection MEPSO could rely on. Through this interface, IT administrators have a control over all Kaspersky applications used within the network.





# MINISTRY OF FINANCE, REPUBLIC OF MACEDONIA

РЕПУБЛИКА МАКЕДОНИЈА  
РЕПУБЛИК OF MACEDONIA  
MINISTRY OF FINANCE

The building of the Ministry of Finance of the Republic of Macedonia has 14.000 square meters distributed over 11 floors with more than 500 employees. It is an exceptionally functional object which is entirely energy efficient. Modern smart building aimed to save energy and protect the environment.

The building itself houses a modern press center, a conference hall and a modern computer room system that allows uninterrupted operation of the Ministry of Finance, particularly of the Treasury and Budget, the two vital sectors of the payment system and the state.

## CHALLENGES

- Replacement of the old traditional communication system with a single but fully redundant platform which delivers world-class business IP telephony and Unified messaging, enabled to support advanced multimedia collaboration applications and mobile services for future expansion.
- Enhancement of the data infrastructure with new stackable PoE switches for floor distribution and aggregation site capable of serving voice, data and video-ready communications solution for up to 500 employees and around 1000 devices, providing reliable but at the same time flexible IT infrastructure for management of complex data and voice services with multitude of applications.
- Cost control and advances centralized management of the whole system.
- Multifaceted protection and control of the IT network and sensitive business data of today's increasingly sophisticated threats without compromising business productivity.

## PRODUCTS AND SERVICES

- Alcatel-Lucent OpenTouch Unified Communication platform
- Alcatel-Lucent 8 Series IP Touch Phones
- Alcatel-Lucent OmniTouch My IC Phones
- Alcatel-Lucent OmniTouch Conference Phones
- Alcatel-Lucent OmniAccess 6450 and 6860 series switch
- Alcatel-Lucent OmniVista 2500 Network Management System
- Kaspersky Endpoint Security Select

## WHY KABTEL?

As a key component of the OpenTouch™ Suite, the Alcatel-Lucent OmniPCX Enterprise Communication Server (CS) is a communication software which delivers world-class business telephony features for medium and large sized companies, offering a choice of centralized or decentralized IP telephony solutions to suit customers' needs.

Complemented by Alcatel-Lucent OpenTouch Multimedia Connection Services it enriches business telephony services and enables a state-of-the-art collaboration experience on Windows PC workstations. It adapts to the way the users work, fostering communications that enrich their business.

You can tailor your Kaspersky Endpoint Security for Business Select solution to meet your specific IT security needs. By adding one or more Kaspersky Targeted Security Solutions, you can add fully-integrated protection for storage, virtualisation, file servers, mobile devices, mail, Internet gateways or collaboration... plus wide-ranging systems management capabilities.

Furthermore, whichever Kaspersky Targeted Security Solution you choose, you will still be able to manage your entire Kaspersky security via one integrated management console – Kaspersky Security Center.

## BENEFITS



### TECHNICAL

- Intuitive telephony experience with dynamic vocal and graphical guidance available on state-of-art IP desk phones, through embedded QUERTY keyboard allowing native dial-by-name functionality, conference phones for increased collaboration and creative exchanges with remote parties and the award-winning touch screen phones which provide quick access to relevant functions through intuitive and easy-to-use menus.
- Improves communication, boosting employees' productivity and customers' interaction by delivering a comprehensive set of telephony services to all staff members at all locations.
- Optimizes operational efficiency and safety through easily deployable IP telephony set and powerful and up-to-date Network Management System.
- Increased business continuity thank to a robust and redundant telephony infrastructure ready for future expansion.
- Highly scalable data infrastructure system that supports a wide range of network scenarios – from access to aggregation and to data center top-of-rack deployments.
- Kaspersky Endpoint Security for Business – Select, powerful, granular endpoint controls combined with proactive security and management of mobile devices and data (Endpoint controls, File server security, Mobile security).



### FINANCIAL

The new Alcatel-Lucent Enterprise and Kaspersky Endpoint Security for Business – Select network management and switch solutions have significantly reduced the upfront costs as well as the costs associated with maintenance and upkeep with a fully integrated system.

- Lowers telecom bills with embedded least cost routing, native VoIP over Wide Area Networks and centralized off-net digital and SIP trunks.
- Lowers total cost of ownership (TCO) through highly scalable software enabling centralized and virtualized deployments that reduce operational costs and improve IT agility.
- Protects IT investment with advanced features enabled for medium-and large-sized companies, without requiring dedicated, high-level technical resources and staff.



### USER EXPERIENCE

The advanced Alcatel-Lucent Enterprise and Kaspersky Endpoint Security for Business – Select network provides future technology industry workers with the technology they need to succeed today.







## SILEKS HOTEL



Sileks Hotel is located in tourist complex St. Stefan, 4 km away from the center of town Ohrid on the regional highway Ohrid – St. Naum, and 10 km from Ohrid Airport “St. Paul The Apostle”.

Sileks Hotel spreads on the coast of Lake Ohrid, placed between the crystal blue lake water and the greenery of the pine forest, where the trail that leads to monastery St. Stefan passes -720 m altitude above sea level. A location like this is a great opportunity for blending of mountain and lake tourism.

## CHALLENGES

- ▶ The Sileks Hotel required unified communication within the hotel, offering mobility services to employees and customers alike. This allows employees to be reachable at any time, and offers a convenient customers' experience.
- ▶ The Sileks Hotel wanted to offer a wide range of services to enhance customers' comfort to maintain loyalty while reducing the operating costs.
- ▶ The Sileks Hotel needed a high performance wireless coverage to guarantee adequate connectivity adapted to the users' needs without any indoor reconstruction activities.

## PRODUCTS AND SERVICES

- ▶ OmniPCX Office Rich Communication Edition (130 Alcatel-Lucent phone sets, 16 Alcatel-Lucent proprietary advanced digital sets)
- ▶ OmniVista 4760 Billing and management system
- ▶ Alcatel-Lucent OmniVista 4760
- ▶ Alcatel-Lucent OmniAccess 4306
- ▶ 12 WiFi access points integrated in one centrally controlled system with radius of managing up to 1.200 concurred Wi-Fi user

## WHY KABTEL?

Alcatel-Lucent's technology is the ideal solution for optimal use of Sileks Hotel communication services and mobility.

Sileks has a new generation of technical devices such as tablets, IP cameras, smart boards and IP fixed telephones.

Appropriate wireless connectivity is essential to take the full advantage of such equipment.

## BENEFITS



### TEHNICAL

- ▶ It is designed to help telecom managers and administrators in their daily tasks and aid them in making strategic decisions in their converged networks through a centralized monitoring.
- ▶ Reduced management complexity while ensuring a maximum level of safety.
- ▶ 45 employees and 250 guests can currently use simultaneously Alcatel-Lucent Enterprise mobility solution.
- ▶ The scalability of the solution enables to support the increase in the number of users in a perspective of a growing number of customers and employees in the next 3 to 5 years



### FINANCIAL

The Kabtel solution enables the Sileks hotel to reduce its operating costs. When deployed in building, the OmniAccess wireless centralized configuration and management model enables to be deployed, monitored, and controlled without any local IT staff.



### USER EXPERIENCE

The old TDM PBX switch to be easily swapped with a new one. Smooth upgrade of new advanced IP services. Capability of being integrated with the existing hospitality services on the spot. Full wireless coverage, easy and fast deployment without any constructions grips.

The mobility solution provided by Alcatel-Lucent enables encrypted and secured communications among the employees and on the other hand to be more responsive and provide wide and comfortable services to customers.

Its major assets include network optimization and a flexible and reliable phone service for both employees and customers of the Sileks Hotel who can fully enjoy their stay in the hotel.





## SUPREME COURT OF THE REPUBLIC OF MACEDONIA

The Supreme Court of the Republic of Macedonia, inaugurated by the 1991 Constitution, has two basic functions in the judicial system of the Republic of Macedonia: firstly, it is the highest court in the country and secondly, it provides uniformity in the application of laws by the courts.

The position and role of the Supreme Court are particularly based on three fundamental constitutional values important for the functioning of the system of government: the promotion and protection of fundamental rights and freedom of citizens recognized by the international law and set down in the Constitution, the principle of the rule of law and the separation of state powers into three significant areas legislative, executive and judicial.

The judiciary of the Republic of Macedonia, headed by the Supreme Court of the Republic of Macedonia is the main pillar of security and protection of human rights and of the principle of rule of law, which are the fundamental characteristics of any modern and democratic state of law.

## CHALLENGES

To implement a high-end security solution capable of scaling in order to meet future needs through proactive protection and high-speed performance along with flexibility and superior control. In addition, to ensure seamless integration within the existing complex infrastructure including endpoints, industrial technologies and mobile devices.

## PRODUCTS AND SERVICES

- Kaspersky Endpoint Security Select- 2.400 clients and 210 virtual servers

## WHY KABTEL?

The Supreme Court selected Kaspersky's multi-layered, fully integrated IT security platform, combining powerful endpoint controls with security for workstations and file servers and with provisions for rigorous mobile security.

Now, almost six years later, the partnership among Kabtel, Kaspersky and the Supreme Court has strengthened, as the countrywide installation of the Kaspersky platform continues, keeping pace with the expansion of the Supreme Court's activities, on a national, regional and local level. At its heart is Kaspersky's market-leading, advanced anti-malware software, which constantly detects threats and delivers automatic updates for a rapid response to these new threats.

Web, device and applications controls, together with a centralised platform management console, provides easy to use security administration tools for desktop, portable, mobile and virtual

endpoints. This combination provides advanced visibility and essential IT security control for Supreme Court as a central pillar of security and protection of human rights and of the principle of rule of law, the fundamental characteristics of any modern and democratic state of law.

## BENEFITS



### TEHNICAL

A lengthy benchmarking process followed by a close collaboration between Kaspersky Lab and Supreme Court's IT teams to implement a seamless, highly-integrated security solution with a minimal impact on productivity or sensitive systems and a maximum impact on threat detection and protection rates.

Easy and fast deployment of 2400 workstations located on over 32 remote spots. One central console for management and monitoring.

A consolidation of entire IT infrastructure in terms of Network Security and ability to make fast deployments of released upgrades, virus & malware definitions. In this way, IT Department is fully capable to promptly manage the potential threats and to prevent eventual data leakage on any levels of the administration system.



### FINANCIAL

Anticipating risks and having comprehensive security measures in place helps in the prevention of system breaches or data losses. The platform has been being expanded in line with the gradual extension of the Supreme Court and its activities.



### USER EXPERIENCE

Centralized management and control of IT systems and infrastructure is an essential part in the protection of public services and public money.







## ZEGIN FARM



ZEGIN FARM was established in 1993 with main activities in retail sale of pharmaceuticals, para-pharmaceuticals and medical devices, food products, dietary supplements, cosmetics and macrobiotics.

The company is one of the largest and most successful in the country with the best infrastructure and the broadest distribution network, with a chain of 100 pharmacies. ZEGIN FARM- is a leader in the country in the number of customers served, with a market share of 62%. Therefore, the slogan "Pharmaceutical pearl of Macedonia" is truly deserved.

## CHALLENGES

- Design, implementation and maintenance of comprehensive information and communications systems based on the latest ICT technologies.

## PRODUCTS AND SERVICES

- Nexans LANmark-6 solution, total length of cable over 3.500 meters and 100 connections
- Nexans Optical Fiber SM, total length over 500 meters and 40 connections
- Alcatel-Lucent OmniPCX Office RCE platforms, 120 Alcatel-Lucent Analogue Phone Sets, 60 Alcatel-Lucent Proprietary Advanced Digital Sets
- Kaspersky Endpoint Security Select, 75 clients
- On-site support & training
- 25 year warranty on all cabling works

## WHY KABTEL?

Kabtel and Zegin have been building their relationship of trust in the last 10 years.

The transparency of the Kabtel teams, their proximity and reactivity are highly appreciated. Due to their scalability, the Kabtel solution capitalize on existing equipment and gradually upgrade them over time. Kabtel quality, cost and benefits were important factors in the choice of a single vendor.

## BENEFITS



### TEHNIČAL

A full spectrum of Nexans LANmark Fiber Solutions is available for various performance levels and constructions to meet different applications and environmental conditions.

LANmark fiber solutions approach offers flexibility and scalability for campus and building backbones, horizontal cabling applications, device termination in data centers and storage area networks.

The OmniPCX Office RCE is at the heart of our complete feature-rich SMB offering called OpenTouch Suite for SMB, an eco-system which includes:

- A complete range of wireline/wireless phones.
- Enhanced off-site mobility to keep users connected any-time, anywhere.
- Efficient desktops to increase productivity.
- Customers' welcome from simple voice mail to integrated call routing, providing a professional greeting and increased customers' satisfaction.
- Single network infrastructure for voice and data services, which reduces costs.

You can tailor your Kaspersky Endpoint Security for Business Select solution to meet your specific IT security needs. By adding one or more Kaspersky Targeted Security Solutions, you can add fully-integrated protection for storage, virtualisation, file servers, mobile devices, mail, Internet gateways or collaboration... plus wide-ranging systems management capabilities.

Furthermore, whichever Kaspersky Targeted Security Solution you choose, you will still be able to manage your entire Kaspersky security via one integrated management console – Kaspersky Security Center.



### FINANCIAL

The time for administrative tasks was enormously reduced and the complex structure was simplified. High energy cost reduction by the new systems and less operating expenses of about 40%.



### USER EXPERIENCE

Availability and working comfort for all employees were optimized by homogeneous terminals.







# UNIVERSITY OF TOURISM AND MANAGEMENT



According to the methodology which acquires practicing knowledge, skills and competencies University of Tourism and Management, is a synonym of the highest standards and requirements in maintaining quality, which places it among the universities that are leaders in the field of higher education in Europe and the world.

As an affiliate member of the World Tourism Organization, (UNWTO) University of Tourism and Management Skopje, constantly works on developing a regional and international cooperation with universities and related organizations in the field of scientific disciplines which are studied at this university.

## CHALLENGES

- Installation of the system for hospitality and retail professionals that includes software, hardware, system integration, consulting and support.
- Setting up the system in a real working environment to perform the students' practical work.

## PRODUCTS AND SERVICES

- Oracle Opera Education Package

## WHY KABTEL?

Kabtel offers MICROS Systems which are a global market leader in the sectors of hospitality and retail industry. MICROS's solution was selected over the competing provider for the centralized benefits it offered. The MICROS-Data Center could house all of the MICROS applications in multi-property and integrated environment, allowing The University of Tourism and Management to use a secure, private network connection to access OPERA.

Since OPERA's reservation and property management systems would be integrated on one database, all reservations could be distributed down to each hotel in a real-time providing single image inventory. Having an integrated Central Reservation System interfacing the global travel agency community, all data could be recorded in one single database which secures a single image guests informations as well as hotel inventory.

Furthermore, direct sales via The University of Tourism and Management corporate hotel websites using the OPERA Web Suite, would dramatically increase web presence and direct bookings. Other crucial reasons University of Tourism and Management selected MICROS for had to do with its ability to place multiple departments on the same platform; to centralize MIS installation; to simplify administration, upgrades and policies; and to provide economies of scale in MIS and administration. In addition, MICROS is able to use a unique telephone number Data Center for all hotels, and to enable a deployment of several hundred hotels in a short timeframe.

## BENEFITS



### TEHNICAL

University of Tourism and Management often makes a difference between "never again" and "long-term relationships."

OPERA enterprise solution is designed to meet various requirements of a hotel of any size or a hotel chain. OPERA PMS provides all the tools a hotel staff needs in doing their day-to-day work – handling reservations, checking guests in and out, assigning rooms and managing room inventory, accommodating the needs of in-house guests, and handling accounts and bills. The property management software is configurable to each property's specific requirements and operates in either single-property or multi-property mode, with all properties in a complex sharing a single database.

OPERA Property Management System is fully integrated with OPERA Sales and Catering, OPERA Gaming and Comp Accounting, OPERA Vacation Ownership System, OPERA Quality Management System, and the OPERA central systems – ORS, the OPERA Reservation System; and OCIS, the OPERA Customer Information System.

- A customized tool with its own branding which meets the facilities menu.
- Now each proposal follows a template in order always to ensure a uniform, professional format.
- It replaces Word documents and e-mails with several attachments
- Amendments can be made easily – no need to locate Word documents and update them.
- It simplifies the tracking and follow - up of proposals.
- Tailored to fit your hotel's operational business needs.
- Scalable to suit the size of your hotel.
- Helps you become more productive, profitable and professional.
- Delivers fast, accurate and online information on your property.



### FINANCIAL

Micros and Kabtel donated the entire system installations as well as applications. University of Tourism and Management is particularly thankful for such a contribution to their educational system. By using and learning about Micros applications throughout the educational curricula of the University for Tourism and Management, students and professors are acquired certain technical and practical knowledge, which they can use right after the graduation at their professional engagements.



### USER EXPERIENCE

During their studies the students at the University of Tourism and Management alongside with the significance of the theory, can really work on Oracle Opera Education Package to gain the necessary additional qualifications which are demanded on the labor market.







## UNIVERSITY CLINIC FOR OBSTRETICS AND GYNECOLOGY- SKOPJE

The University clinic for Obstetrics and Gynecology - Skopje is a modern, top public health medical institution in the country and the one that steps alongside with modern European clinics for gynecology and obstetrics.

With more than 80 doctors and nearly 350 other medical staff working day and night to make many mothers happy and help many women, University clinic for Obstetrics and Gynecology - Skopje provides a complete gynecological treatment in any field of gynecology and obstetrics, especially at births.

## CHALLENGES

Internet is a tool which if not well controlled could easily be misused. University clinic for Obstetrics and Gynecology - Skopje wanted to control the non-productive surfing and downloads of the employees, stressed the need to perimeter the level of security which can control the access of the network resources of the institution. The gateway level anti-virus and anti-spam solution was also needed to block the Internet originating attacks.

With lot of users working from home or remote, University clinic for Obstetrics and Gynecology - Skopje was also planning to safely connect all these users over the Internet, to the Head Office to bridge the geographical gap and to achieve high business connectivity.

It was looking for a single solution that would reduce the hassles; prove easy to administrator; detect unproductive surfing and augment productivity and provide seamless and cost-effective business connectivity through VPN over Internet.

## PRODUCTS AND SERVICES

Cyberoam Unified Threat Management hardware appliances offer comprehensive security to organizations, ranging from large enterprises to small and branch offices. Multiple security features integrated over a single, Layer 8 Identity-based platform make security simple, yet highly effective. Cyberoam's Extensible Security Architecture (ESA) and multi-core technology carry the ability to combat future threats for organizations' security.

- ▶ Cyberoam CR100iNG UTM Appliance
- ▶ Anti Malware
- ▶ Anti Spam
- ▶ Web and Application Filter
- ▶ Intrusion Prevention System
- ▶ VPN
- ▶ Bandwidth Control
- ▶ 8x5 Support

## WHY KABTEL?

Cyberoam's Identity-aware security policies and On-Appliance Reporting team-up to provide transparency over all network events. Its most useful feature is the use of Identity in Cyberoam. Identity is used throughout the UTM to enable the end users with enough network resources to achieve a maximum productivity. Whenever the management asks, an IT manager has very clear reports to show: Who has done What and When!

## BENEFITS TECHNICAL

Cyberoam's Application Visibility & Control feature enables the prioritization of applications based on User identity, time, applications, and bandwidth, allowing a great flexibility and a real L2-L8 visibility & control. The advanced application controls the classification of the applications based on their risk level, characteristics and technology, offering more granular controls. The pro-active protection model eliminates the need for the administrator's manual intervention for policy updating when new applications have to be added to the existing list.

Cyberoam Intrusion Prevention System protects against network and application-level attacks, secures the organizations against intrusion attempts, malware, Trojans, DoS and DDoS attacks, malicious code transmission, backdoor activity and blended threats.

Cyberoam's signature-based Intrusion Prevention System carries thousands of automatically updated signatures, enabling protection against the latest vulnerabilities.

Gateway anti-virus and anti-spam patrol the web and mail protocols to prevent any malware from sneaking in via Internet. Cyberoam's anti-virus solution which has industry's best virus detection rate ensures malware free network. The anti-spam solution blocked almost 100% of spam, as soon as Cyberoam was deployed.

Cyberoam's VPN solution bridged the geographical distances between the organization's branch and head offices. Highly encrypted traffic enforced security over the Internet. VPN proved to be a benefit on many fronts as it provided secure business connectivity at a fraction of the cost incurred prior to Cyberoam deployment. It eliminated the need of expensive long-distance leased lines and telephone calls.

Cyberoam's Layer 8 Technology treats user identity as the 8th layer or the "human layer" in the network protocol stack. This allows administrators to uniquely identify users, to control the Internet activity of these users in the network, and to enable policy-setting and reporting by username - adding speed to security.

**On-appliance Reporting** Cyberoam has been the first and only vendor in the industry to offer on-appliance reporting with real-time logs and reports, saving the cost of deploying a dedicated reporting solution. The 1200+ in-depth reports offer a real-time insight in the user's and network activities, helping the organizations to manage security, to display compliance and forensic analysis, unmatched by any other network security vendor up till now. Cyberoam reports include dynamic and animated reports, in-line graphs, and country maps.

## FINANCIAL

As many other IT managers, the apprehension that good a security could only be achieved at the cost of business, has been proven wrong by Cyberoam. In a true sense, Cyberoam is a Business Enabler and One-stop solution for all our security needs. Along with security, Cyberoam also ensures productivity and connectivity.

### Single Appliance Solution

- ▶ No need for multiple security appliances
- ▶ No need to manage multiple vendors

### Reduced TCO

- ▶ Low CapEx & OpEx
- ▶ Higher ROI
- ▶ Security subscriptions as needs grow

### Ease of Management

- ▶ Single Vendor to contact
- ▶ One product to learn & manage

## USER EXPERIENCE

Cyberoam's Checkmark Certified Anti-Virus and Anti Spyware prevent the entry of malware and spyware at the gateway itself and ensure clean mail traffic and safe web browsing. They provide real-time protection against constantly emerging cyber threats resulting in maximum network uptime.







## MACEDONIAN TELECOM - FIBER TO THE HOME & FIBER TO THE OFFICE PROJECT

Macedonian Telecom is the largest provider of telecommunication services in the country. Since its establishment the company has been updating and expanding its services by introducing the latest achievements of technology.

As an operator of telephone service today Macedonian Telecom is a provider of IP TV, Internet and VOIP services. With the introduction of ADSL modem it opens opportunities for high speed internet and IPTV service.

As a final achievement in Telecommunication Company it introduces the optical fiber as a medium for data transmission. This project has been named FTTH & FTTO. The meaning hidden under these abbreviations is an optical fiber to every home or office.

## CHALLENGES

- ▶ Increase the level of service.
- ▶ Possibility of extreme speed Internet.
- ▶ Introduction of new services in the IPTV segment.
- ▶ Abolition of overhead lines.
- ▶ Full modernization and optimization of the network.

## PRODUCTS AND SERVICES

- ▶ Nexans FIBER Optic Cables
- ▶ Nexans Outlets
- ▶ Nexans Accessories
- ▶ Nexans Optic Splitters
- ▶ Dura-Line Micro Ducts

## WHY KABTEL?

Kabtel is a company which is present on the market for a long time with many significant projects in its portfolio completed with excellent results.

The company together with Nexans as important partners of Macedonian Telecom since the beginning of the FTTH project has been a part of its implementation.

With its expertise and excellent knowledge about the issues present in the optical networks of professional staff team member has helped the field with suggestions and solutions to specific problems which have had occurred during the execution of the project.

## BENEFITS



### TEHNICAL

FTTO (FIBER To The Office) is a centralized cabling technology for LAN network office environments. The solution combines passive FIBER cabling and active FTTO switches to provide end user device with Gigabit Ethernet services.

A FIBER is laid up vertically and horizontally from the central building distributor to the adjacent building, and then to a FTTO switch at the workplace or consolidation points, which does away with the need for Floor Distributors. The FTTO switch ensures intelligent conversion from FIBER to copper and vice versa.

FTTH (Fiber To The Home) combines fiber and copper for optimal network performance, offering the speed, reliability and long distance coverage of fiber plus the Ethernet services to devices via standard copper-based RJ45 technology. This solution meets all current network requirements in terms of flexibility, cost-efficiency and network interoperability and adds the practical advantages of fiber.

FTTH equals traditional cabling performance but additionally provides significant cost benefits, especially where large distances must be covered or if building requirements impose restrictions.



### FINANCIAL

With proper implementation and change of old copper the network company saves on maintenance, obstacles and interruptions as simple as a servant leading to increased end user satisfaction which is the purpose of the project.



### USER EXPERIENCE

The cooperation between all parties went very smoothly. We were all pioneering together and each company made a real contribution.

Macedonian Telecom did not face any big problems or unwanted surprises and everything went according to the plan. If all users continue to be satisfied with this solution, Macedonian Telecom may well expand it to other locations.







## MORE THEN...

- **15.500.000 m Network UTP/FTP cable** deployed
- **250.000 m Optical/fiber cable** conducted and deployed
- **650.000** certified **Connectors Cat5e/Cat6/Cat6a/Cat7**
- **58.000 Internet Security** protected workstations
- **56.000 Data Ports** mounted
- **56.000 FTTH Plugs** installed
- **19.000 Optical Adapters** implemented
- **15.500 FTTH users** configured
- **6.800 Switches** managed
- **5.000 IP / VoIP voice ports** installed and configured
- **3.500 Firewall active** users
- **3.100 Executable and Monitoring elements** mounted and configured
- **1.700 Wi-Fi Users** covered
- **500 Access Points** set
- **400 Base Stations** installed and configured
- **180 PABX systems** mounted and configured
- **180 Radio Links** installed and configured
- **90** integrated **Security solutions**



# THEY GAVE US THEIR TRUST...







# KABTEL

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