

LANactive

Switch to the future

Fibre Optic Solutions for Modern Hospitals



eHealth a Digital Revolution in Healthcare

Healthcare is becoming increasingly digital. The number of electronic devices for the systematic collection and management of health data as well as for the optimization of the care processes and hospital logistics is growing. Electronic health cards, megapixel HD cameras for patient examination, digital Dictaphones for paperless notes, VoIP, electronic treatment assistants as well as interactive patient logistics and hospital management software are just a few examples of the eHealth revolution we are witnessing today.

Currently patients get Wi-Fi in bed, enjoy IPTV in the ward, use mobile Healthcare Apps for a faster recovery, make mobile Doctor Visits and rely extensively on digital signage screens for information regarding their treatment procedures, orientation on the hospital campus and even canteen menus. In addition the underlying network

technology in hospitals is changing as Cloud Computing, server virtualization and intelligent building automation are becoming a reality.

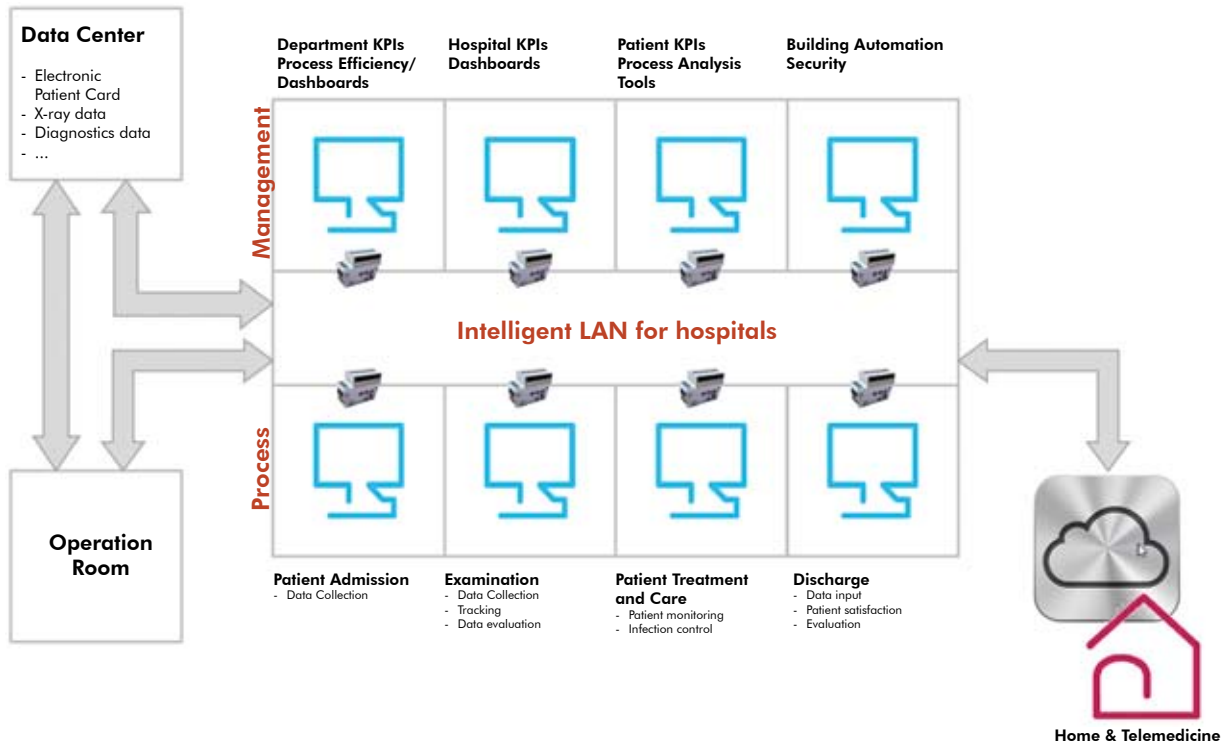
Future-proof infrastructures in hospitals require thorough planning from the very start.

- They need high bandwidth now and even more bandwidth (40 Gbit/s) in the future.
- All elements of the system must be highly available to exclude any risk of potential downtime.
- Care should be taken to make the system scalable, i.e. easy enough to accommodate new users, services and applications.
- The network should remain flexible enough to embrace any future physical moves, changes and add-ons.



eHealth

Modern Hospitals need highly available IT Infrastructures



- Despite growing convergence it is still very important to keep the network simple (in configuration, administration and maintenance).
- Most importantly, the network should stay safe and secure to minimize all risks to human life.

Due to their important role in securing a nation's well-being hospitals belong to public critical infrastructures. Any failure or impairment to the hospital network can have dire consequences for people. That is why it is crucially important to hospitals to keep their services and processes both highly available and safe and secure.

An ideal solution to the IT challenges in health-care are FTTO infrastructures based on managed access switches. These switches were specially developed for life critical applications in medical environments and provide 100% safe and secure Gigabit Ethernet for an optimized network performance in hospitals. For standard office applications where safety requirements are not so high we recommend using Standard FTTO Micro-Switches which support WLAN Access Points and other standard Ethernet Applications.

FTTO-Based LAN



FTTO (Fibre to the Office) is a future-proof LAN cabling concept based on fibre optics. It works particularly well within hospitals and clinics and other campus-style architectures.

In an FTTO infrastructure, fibre is installed from the central switch to the connection point at the workstation or in the ward, where a dedicated Ethernet switch ensures intelligent media conversion from fibre to copper. Each FTTO-switch is connected to the central distribution switch with one or two SFP-Uplinks and has four TP¹ user

ports. Each of these ports has a Gigabit Ethernet capability. Office and medical electronic devices at the work station, in the ward or in the operation room can be directly connected to the switch via the standard RJ45 network cable.

FTTO is like a green highway for your data: high speeds, large distances, lots of opportunities and virtually no hurdles.

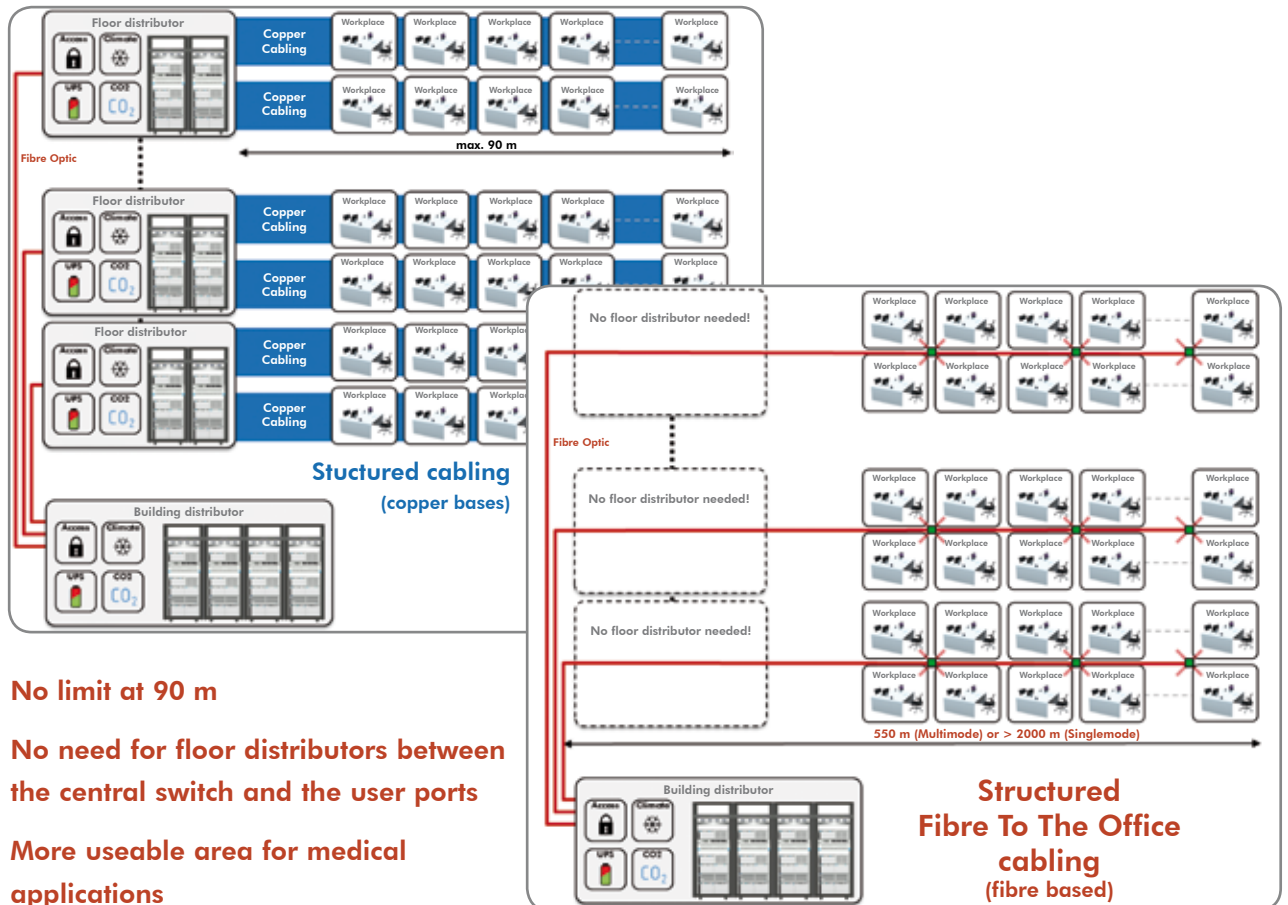


An Overview of FTTO Benefits

- Future-proof (scalable, flexible, sustainable)
- Investment protection/life cycle
- Secure network
- Low maintenance cost/ simple administration
- Low investment cost
- Quick and simple realization
- Low energy consumption

¹ Twisted Pair, copper based user ports

A Comparison of Cabling Structures



No limit at 90 m

No need for floor distributors between the central switch and the user ports

More useable area for medical applications

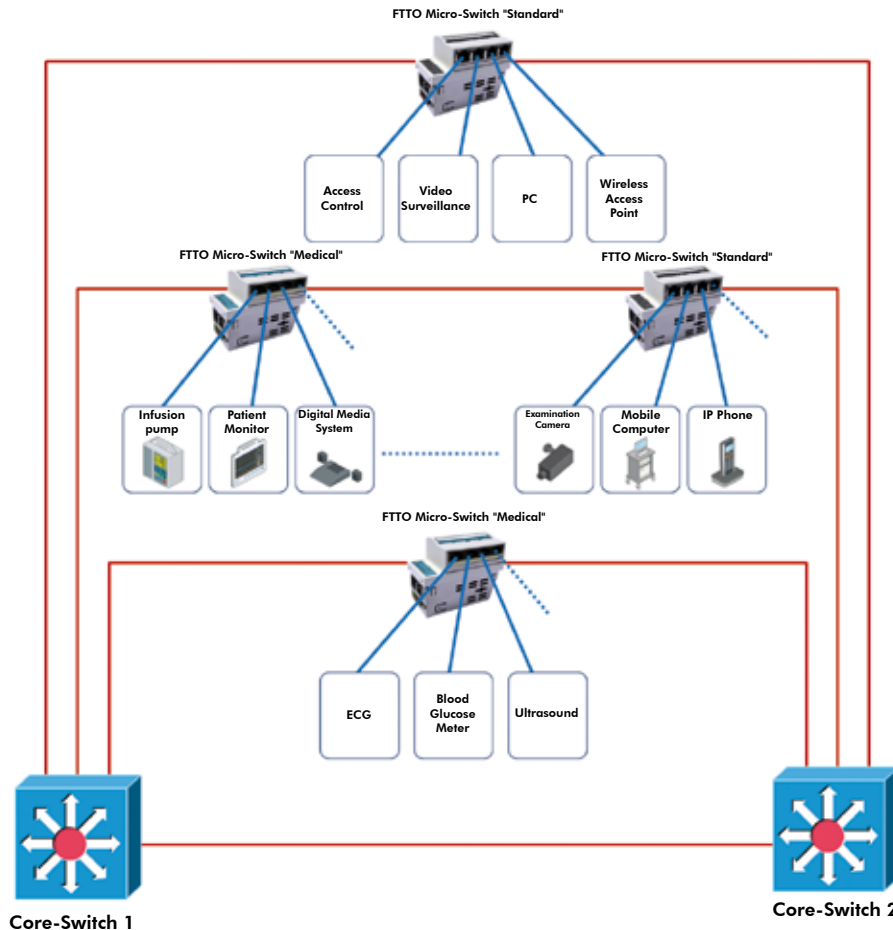
FTTO offers a simpler, more flexible cabling structure than traditional cabling concepts. It combines the benefits of both copper and fibre and delivers maximum performance with minimum energy waste.

- Simple and flexible network roll-out
- No need for floor distributors
- 60% less installation time
- Low cable volume (1 fibre cable instead of 4)
- Low fire load
- High bandwidth reserves thanks to fibre
- No grounding problems
- No problems with electromagnetic interference
- Simple redundancy up to the network outlet
- Up to 40% less TCO (Total Cost of Ownership)

FTTO based network structures simplify network rollout, management and service.



Super High Network Availability & Advanced Redundancy Concepts



The passive components of an FTTO cabling infrastructure are very easy and flexible to install. They make advanced redundancy concepts for life critical applications cost-effective.

Based on a combination of Ring and Star Topologies FTTO ensures extremely high availability of the network.

As the Micro-Switches are positioned along the network in a closed ring structure, downtime risks are significantly reduced. If one network link is disrupted and is no longer available or if a core layer switch fails, there is no loss of critical data, as both data and power are supplied via another link.

Benefits

- Maximum Network Flexibility
- Scalability
- Modular Set-Up possible based on specific requirements
- Prefabricated Components
- No special expertise required
- Maximum Network Availability
- Advanced Redundancy
- Best ROI on Investment

LAN-Infrastructures based on FTTO make a hospital infrastructure highly available, reliable and secure!

FTTO Saves Power and Money

Sustainability is becoming more prominent in both the private and public sectors and helps to save energy costs for really important investments.

With FTTO there is no need for energy hungry floor distribution rooms. These usually house active equipment, cooling accessories and extra UPS¹ units.

Fewer technical rooms means less power consumed and more money saved. Fewer technical rooms also means more useable area.

Due to fibre physics, less energy is required to transport data over fibre. Tests show that fibre transmission can halve energy requirements in comparison with traditional cabling solutions.

Moreover, the switch itself consumes extremely little power, i.e. 0.5 - 1 W per port for data transmission.

FTTO Micro-Switches also support such Features as "Eco-Mode"² and Energy Efficient Ethernet (IEEE802.3az). EEE helps to save up to 50% power, as power is consumed only in case of an active data transfer. As soon as the switch detects that there is no data exchange between the port and the terminal user device, the port switches into the power saving, idle "Standby Mode".

Hospitals which have to deal with limited budgets will be particularly amazed at the positive effects of FTTO.

Up to 70% power may be saved due to FTTO.

¹ Uninterruptable power supply

² A special energy saving feature developed by Nexans which helps to reduce data transfer speeds based on the user's needs and preferences and thus optimizes overall power consumption of the IT-network.



FTTO Makes Gigabit Ethernet Cost-Effective for Hospitals

Save 30% and More With FTTO

Flexibility

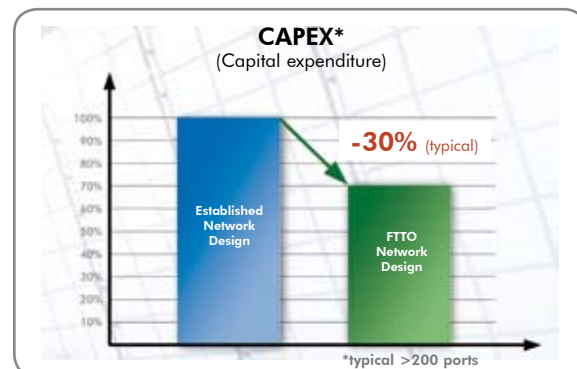
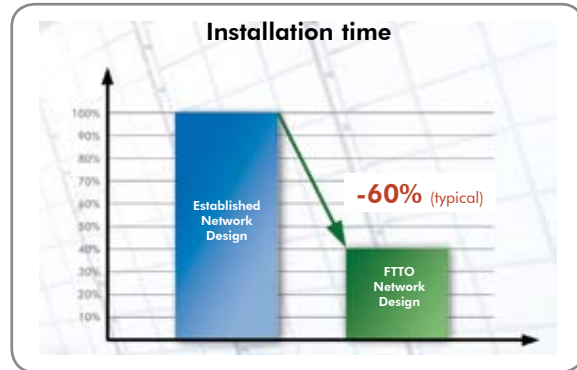
FTTO requires 60% less installation time. The LAN design is extremely flexible and discreet. All the physical changes, moves and add-ons are easy to implement without stopping work.

CAPEX (Capital expenditure)

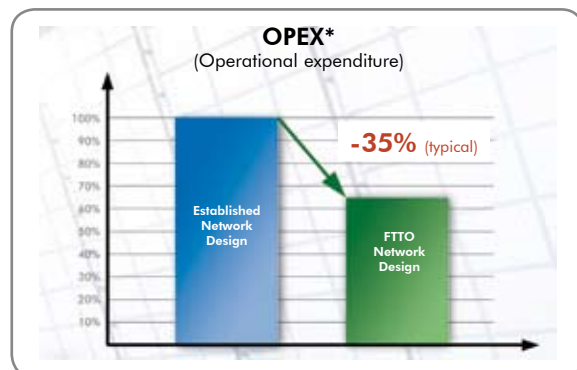
FTTO reduces CAPEX by over 30%. Less active and passive equipment means less acquisition costs. Moreover, FTTO infrastructures are future proof. They offer great bandwidth reserves (40G plus) and potentially have a life of over 25 years. When you take into account the long-lasting effects of the investment and its amortisation time, costs for the acquisition and installation of FTTO become particularly attractive.

OPEX (Operational expenditure)

Thanks to the centralised structure of FTTO with no floor distributors it is much easier to service the network and reduce costs. There are no service costs for the attendance and maintenance of extra air-conditioning, fire protection, uninterruptible power supply units, etc. in the distribution room. And you need fewer qualified IT-staff to patch the system.



* Includes: Active and passive components, installation services and building costs



* Includes: Services for Infrastructure, Network Management Costs, Care Packs, Repair Services

A Typical Cost Estimate For a Hospital Project



FTTO LAN design is discreet and inconspicuous, which is most suitable for hospital environments.

New users, services or applications can be easily accommodated into the network. Moreover, network adjustments, upgrades and physical changes can be seamlessly integrated into the existing network without any downtime.

Practice shows that a reduction of up to 40% may be expected in total costs of the complete infrastructure if it is based on FTTO.

Please note: accurate cost estimates for each specific project can be made after the inspection of the campus conditions.



IEC/EN 60601-1 and the EU Directive for Medical Devices, MDD 93/42/EEC

Currently electronic medical devices and appliances are all connected to a computer. They measure certain patient well-being and health status values. This data is immediately collected, analyzed and assessed by powerful software applications installed on the computers. The data is then conveyed via the network to the central server.

Medical equipment is subject to strict laws and regulations which dictate clear technical standards. One such important regulation is the European „Medical Devices Directive MDD 93/42/EEC“, whose primary objective is to ensure safety and security of patients, staff and third parties while on a hospital campus.

The network connection between a medical electronic device and the Ethernet network is regulated by the standard IEC/EN 60601-1. The Standard sets requirements for medical devices

and electronic systems in a hospital IT network. These medical devices and electronic systems are considered as a source of potential danger to human life (for example, a difference in voltage potentials may lead to an electric shock).

To prevent all dangers from shocks in electronic medical applications, the IEC/EN 60601-1 Standard envisages the use of special network isolators to separate the voltage potentials. It makes it obligatory to ensure a galvanic separation of the Ethernet connection between the network switch (in an operation room, intensive care unit, etc.) and the medical electronic device.

Please note: No PoE is possible in switches where network isolators are installed, i.e. for medical applications.



With the “Medical” Micro-Switch On the Safe Side



Nexans got inspired by customer wishes in the field of healthcare and designed a special FTTO Micro-Switch for critical medical applications. The medical GigaSwitch V3 TP SFP-I MED ES3 is the first switch to conform to the International Safety Standard IEC/EN 60601-1. It provides excellent Ethernet connectivity and eliminates all risks of electric shock.

The Medical Switch includes four user ports (10/100/1000 Mbps) and two uplink Ethernet ports with a full Gigabit capability.

To minimize all health safety risks, there are four network isolators integrated into the switch (one isolator per port) with a minimum voltage level of 4kV and 2 MOPP (Means of Patient Protection) per isolator.

2 MOPPs means there should be an 8 mm distance between the data-data and data-earthing wires, double that required by the IEC/EN 60601/1 Safety Standard. The enhanced safety features of the Medical Micro-Switch make it unique.

The switch itself fits ideally into the Hospital environment, takes up very little space and delivers excellent network performance for life critical applications.

The “Medical” Micro-Switch can be used in medical facilities without any restrictions, i.e. in operation rooms, intensive therapy units and other life critical applications – wherever a patient’s life is at risk.

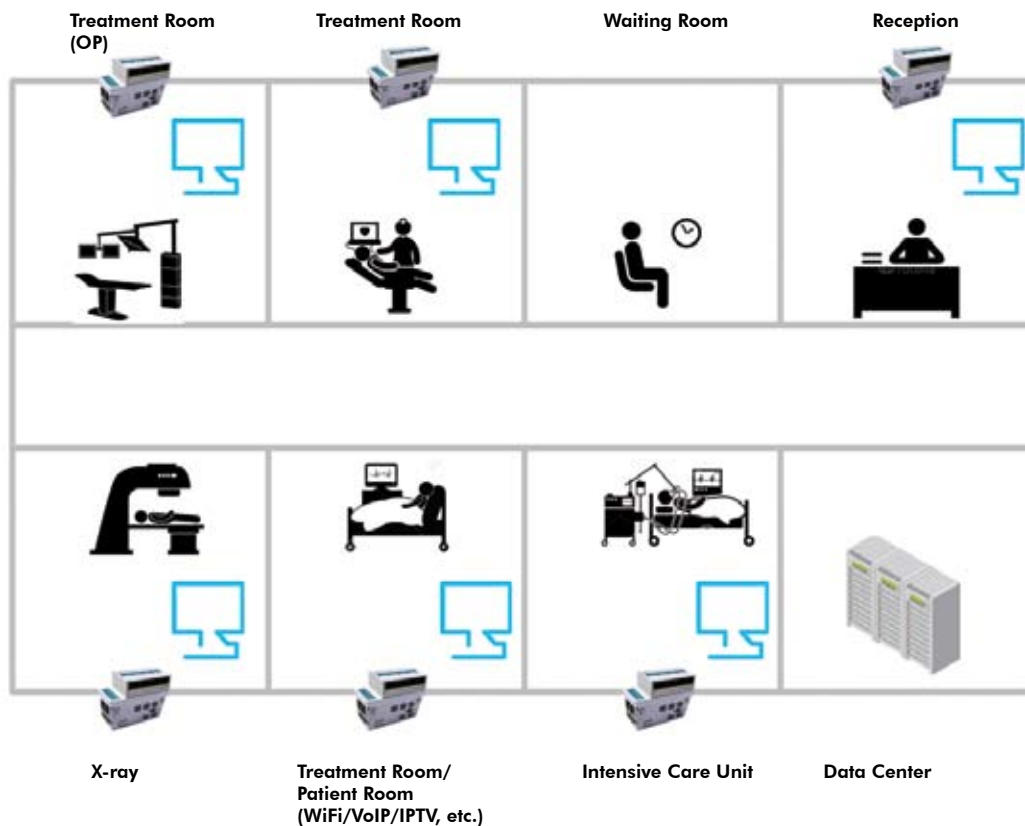
Application

The "Medical" GigaSwitch provides the ideal basis for the realization of secure Gigabit Ethernet networks in hospital environments. It connects critical medical applications via Ethernet to the central management system in an easy and secure way.

Due to the double insulation between the data wires of the Micro-Switch "Medical", critical electronic appliances like electrocardiography devices, patient monitoring systems, infusion pumps and glucose meters are rendered 100% safe and secure.

- For life critical applications in medical facilities
- 100% safe and secure Network
- High Network Availability and Advanced Redundancy
- System parts and components available for a period of over 5 years
- The Switch is quick and easy to disinfect and sterilize
- Full Gigabit Connectivity
- Simple Roll-Out, Configuration and Management
- Conform to IEC/EN 60601-1

The system easily accommodates new users, services and IT-applications for data, voice and video.



Nexans “Medical” Micro-Switch for Modern Fibre To The Hospital

Four Galvanic Network Isolators

Integrated double Insulation between data wires (8 mm) offers complete safety for the patient and staff.

Horizontal and vertical installation with a single 45 mm design

Thanks to a rotatable head design, the TP switch module can be installed either vertically or horizontally. There is no need to order separate switch types.

Memory Card with MAC Address

The optional Memory Card always stores the most recent configuration of the switch. It saves settings automatically once installed. In case of a replacement or system reboot just take it out from the old switch and insert it into the new one.

Powerful Management Software

Switch software management tool allows simple and secure configuration from a central location. Rapid Spanning Tree, central authentication server (Radius), quality of service and prioritization, LLDP, IGMP, SCP, diagnostic functions and SNMP traps are some of the realized features.

Security

Nexans Switch systems support all relevant security mechanisms such as IEEE802.1x (login and password) and MAC-based access control. In connection with a central authentication server, e.g. RADIUS, security in hospital infrastructures can be heightened.

Standard FTTO Switches with Power Source Equipment (PSE+)

For life critical applications, e.g. in operation rooms, intensive therapy centers, no PoE is possible due to integrated isolators. However, for non-medical applications we recommend using Standard Micro-Switches. Thanks to the implemented PoE+ functionality, these can supply power and data directly to all modern office devices including Wireless Access Points in line with IEEE802.3at.

Features

- Suitable for many installation systems thanks to its 45x45 Snap-in design
- Lowest power consumption thanks to Energy Efficient Ethernet (EEE) and Eco-Mode
- Full Gigabit Ethernet
- Comprehensive Security functions (SCP, SSHv2, HTTPS, RADIUS, SNMPv3, IEEE802.1x, etc.) & Integration in an ARP Guard Secure Management Module
- Interoperability with all core switch vendors
- Power over Ethernet (PoE+) according to IEEE802.3at and af (for non-medical applications)
- Free programmable function input with an alarm functionality
- Constant monitoring of the optical parameters with threshold values and alarm functions
- Cable Diagnostics featuring the exact localization of errors on the twisted pair cable links

Success Story

Danish Hospitals Choose Nexans



Project characteristics and requirements:

- over 10,000 FTTO Switches required;
- 187,000 m² of new construction area;
- Integration of 57,000 m² of the existing hospital area;
- Four hospital locations will be merged and move to one location;
- Only two data centers (distribution rooms with active equipments) for the whole campus

"THE NEW CONCEPT PROVIDES US WITH THE BEST POSSIBLE FLEXIBILITY TO DESIGN OUR NEW BUILDINGS TO RESPOND TO CHALLENGING REQUIREMENTS OF MODERN HEALTH CARE INSTITUTIONS – AND THIS IS AN OUTSTANDING COST ADVANTAGE COMPARED TO MORE TRADITIONAL INFRASTRUCTURES. NEXANS HAS CONVINCED US WITH THE BEST IN-CLASS OFFERING RELATED TO BOTH PRODUCT PERFORMANCE AND VALUE", manifests Kenneth Becker.

The Danish Region Midtjylland awarded Nexans a multi-year frame agreement for the delivery of 10,000 Ethernet Micro-Switches.

These access switches are key to an innovative fibre based LAN concept called "Fibre-To-The-Office (FTTO)" developed by Advanced Networking Solutions Group, a unit of Nexans.

Under the contract signed by Kenneth Becker (Region Midtjylland) and Ole Nielsen (Managing Director at Nexans Jydsk Denmark) FTTO Micro-Switches will be first deployed to upgrade the IT-infrastructure of the existing hospital in Viborg. Then they will be used to equip the upcoming new hospital campuses in Aarhus (The New University Hospital, DNU) and Gødstrup (DNV). At a later stage it is planned to supply 20 smaller hospitals and other public institutions with FTTO Micro-Switches.

In an FTTO infrastructure fibre is deployed all the way to the outlets. There are no constraints of legacy copper based structured cabling, such as the 100 m distance limit. There are also no cost intensive local distribution rooms. FTTO infrastructures provide an unmatched level of full Gigabit performance, with implemented advanced redundancy features.

Ole Nielsen is convinced: "Midtjylland's visionary decision to become the first large scale FTTO user in Denmark is a major breakthrough for this concept on the Danish market. The decision for this fibre optic-based network will open new perspectives beyond hospital areas for the future use at other building sites like airports, banks and offices in Denmark".

LANactive Product Range (Extract)

Active LAN Systems for FTTO



Standard FTTO Micro-Switch with PoE+, for Office Applications

- Gigabit Ethernet Switch
- International 45 mm Form Factor
- horizontal or vertical installation
- 4x 10/100/1000 Mbps Twisted Pair User ports
- SC fibre optic uplink (Multimode or Singlemode) or
- TP and SFP Uplink or 2x SFP Uplink
- System Configuration Backup on a Memory Card and boot-up with a Memory Card MAC address and Configuration Settings (Optional)
- 54 VDC power supply for the Micro-Switch and PoE+



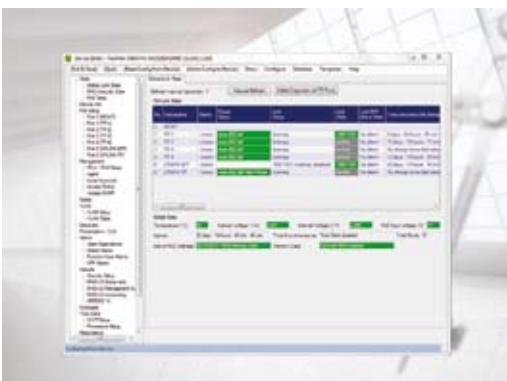
FTTO Micro-Switch "Medical", without PoE+

- Gigabit Ethernet Switch
- Double Isolation between Data Wires
- 4 galvanic insulators (one insulator per port)
- horizontal or vertical installation
- 4x 10/100/1000 Mbps Twisted Pair User ports
- SC fibre optic uplink (Multimode or Singlemode) or
- TP and SFP Uplink or 2x SFP Uplink
- System Configuration Backup on a Memory Card and boot-up with a Memory Card MAC address and Configuration Settings (Optional)
- 230 VAC supply for the Micro-Switch



SFP Pluggable Transceiver

- Fast Ethernet or Gigabit Ethernet
- Fibre Optic LC Connector
- Digital Diagnostic Monitoring Interface



NexMan Management and Configuration Tool

- Individual generation of master configurations (single parameters selectable)
- Storage of configuration settings in a database (up to 100 history entries)
- Layer 2+ 3 auto discovery
- Time for the software update can be preset



Nexans network solutions are used throughout the world and have proved their reliability in many different applications. Nexans products are manufactured in Germany on the basis of thoroughly selected components and in line with the current Quality Control Standards (ISO 9001).

Our customers include leading international companies and institutions, i.e. power utilities, hospitals, universities, ministries, railway companies, airports, industrial plants, banks and insurances. We have gathered over 25 years of experience in the research, development and production of FTTO Micro-Switches and in the design of the most sophisticated networks.

A LAN System which grows with the needs of its users has to be designed right from the very start with such a level of flexibility as to accommodate most easily all subsequent moves, add-ons, upgrades and changes.

We guarantee the exceptional quality of our products and provide our partners and customers with extensive support. Please get in touch with us for assistance with your FTTO project.

LANactive
Switch to the future

LANmark
Connect to tomorrow

LANsense
Take control of your network

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