SMART CITY

Using Fiberroad Smart City Solution to Drive Urban Innovation

FIBERROAD

A smart city is a technologically advanced urban area where electronic and sensor technologies are used to collect and analyze data. This data is used to improve city operations and manage resources more efficiently. The benefits of a smart city are numerous. In addition to maximizing resources, smart cities can reduce energy and transportation costs.

The process of implementing a smart city begins with the definition of the community it will serve. This definition can be based on geography, links between cities, or flows of people. In some countries, this definition may not be a realistic representation of their communities. Therefore, when establishing a smart city, it is important to identify the community's unique characteristics and how these might improve the city.

A smart city may include utilities such as a smart grid, which distributes energy more efficiently and effectively. Other smart city systems include smart water management systems, which monitor water flow data to detect floods and leaks. It may also include smart waste management systems, which optimize the removal of waste by sending automated notifications to sanitation crews when dumpsters are overflowing. It may also include smart buildings, which can be monitored to reduce energy consumption and increase safety.

The technology that powers a smart city is a key element to its success. The goal is to make urban life easier for people by integrating technology with public services. This means that cities will be able to collect data and use it to make better decisions about everything from transportation to waste management. Smart cities will have a variety of ways to manage energy and water, and the technology that makes this possible is constantly improving.

How Industrial Ethernet and IIoT Benefit Smart City Construction

Smart cities are becoming increasingly important for sustainable development, and the technology that enables them is becoming more advanced. With technologies like the Internet of Things, edge computing, artificial intelligence, 5G communications networks, and machine learning, smart cities are becoming more accessible and integrated than ever. The combination of these technologies can help cities reduce costs and improve infrastructure such as energy distribution and refuse collection. It can also help cities improve their quality of life by reducing congestion and traffic.

The introduction of smart city technologies has brought many benefits to cities and communities around the world. For instance, cities can utilize the latest in smart city technology to improve their quality of life, reduce energy consumption, and promote sustainable water practices. Additionally, smart cities can use digital technologies to better understand their carbon footprint and develop policies that help reduce emissions. By investing in smart technologies, cities can also improve their infrastructure and increase their economic growth. This allows them to make better use of their existing physical assets and gain valuable customer data.
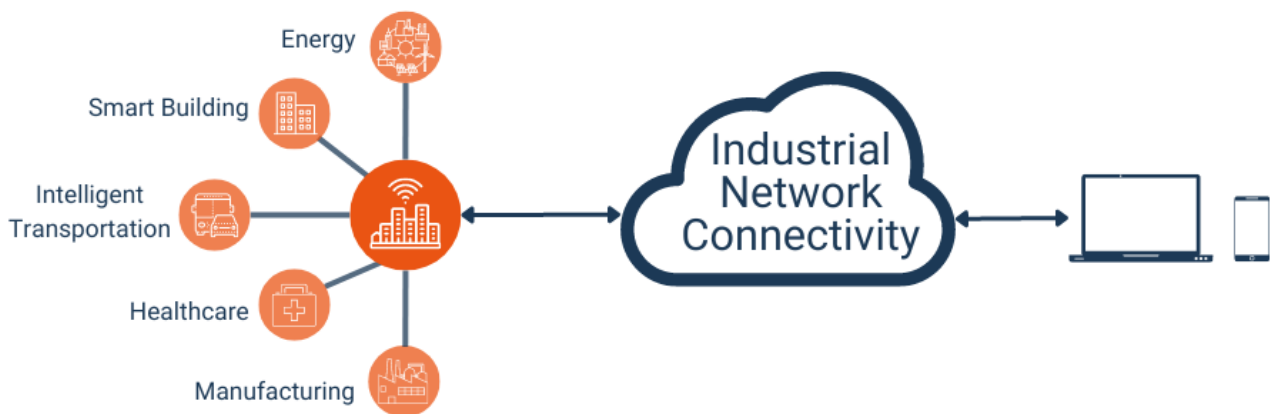
Smart cities also offer safety measures, such as early warnings in the case of natural disasters. They can also improve infrastructures by monitoring leakages in water mains and pipes and alerting local authorities when repairs are needed. They can also improve the efficiency of manufacturing and urban farming. Smart city technologies can also reduce costs associated with public workers.

With the rise of IIoT technology, the growth of Smart Cities, Smart factories, and Industrial IoT is accelerating. The number of endpoints in these systems is increasing dramatically and the deployments are becoming larger and more complex. This trend will continue to increase in the years to come. The success of smart cities depends on collaboration between the public and private sectors. In fact, the bulk of the work that goes into creating smart cities is conducted outside of the government.

Edge Network And IIoT, How They Fit Together

The Edge Network and IIoT work together to enhance a Smart City operations. This type of computing connects client devices to a network that is closer to the actual process. It can also improve the responsiveness and smoothness of operations. Examples of edge devices include IIoT sensors, employee notebook computers and smartphones, security cameras, and internet-connected microwave ovens.

Edge IIoT devices communicate with one another using an open systems interconnection framework. This enables them to share data and connect to a cloud or an Internet network. Edge devices must be capable of managing network connections and ensuring that they can route data. They must also have failover management and redundancy to avoid disruption of the data stream.
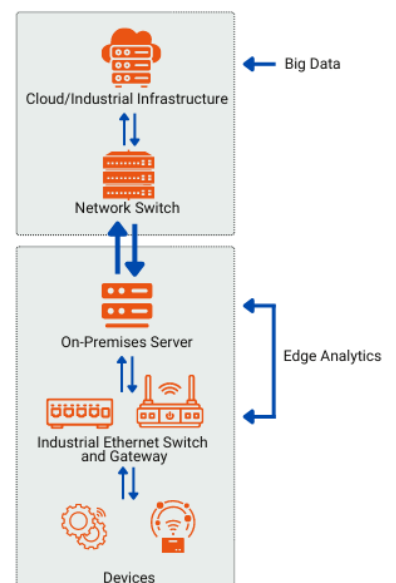
The Challenges of IIoT Deployment in Smart Cities

Harsh Environments
Fiberroad's line of hardware is designed to withstand harsh operational conditions, from blast furnaces to sub-zero degrees. To endure operating temperatures ranging from -40°C to +85°C, our hardware uses high-quality industrial-grade materials to guarantee a long Mean Time Between Failures (MTBF).

With the fanless design and all-aluminium alloy enclosures, our devices will reduce the number of moving parts, save space, and reduce breakdowns and failures, thus prolonging your investment's operating life.

Interference and Susceptibility of Electromagnetic
In factories, high-voltage and electromagnetic interference can cause serious damage and compromise system reliability if installed devices are not properly shielded and isolated from electromagnetic discharges.

It is possible to experience equipment failures without proper precautions. A surge of 2,000 Volts applied to a power supply unit can severely damage your system. It is necessary that all devices are designed to avoid interference with the surrounding equipment, as their own radiation can cause noise and interference. During severe electromagnetic interference, high-temperature variations can result, server and network switches may be disabled, data communication is interrupted, and even data may be destroyed.

Smart Urban Utility Tunnel Solution

Urban Utility Tunnel Challenges

While utility tunnels have major benefits, there are also serious challenges to their development. These include the risks associated with urban excavation, management, and governance. While these challenges are not insurmountable, smart technology can help overcome them. Smart technologies can collect and share comprehensive data and provide collaborative working environments.

The challenges to utility tunnel construction include the need for underground clearances for other technical infrastructure systems, as well as the need for safe, ergonomic, and comfortable working environments. Other considerations involve visual and physical intervention. A well-designed utility tunnel can provide for the safety and convenience of workers in the surrounding community. Developing utility tunnels can be a complex and costly undertaking.

Use Of Industrial Ethernet To Improve IIoT Management Of Utility Tunnels

Among the many benefits of IIoT is its ability to increase grid efficiency and reliability. This technology also has the potential to improve the economic aspects of electricity. With the use of smart devices to collect and analyze data from sensors, IoT has a wide range of benefits for utility companies and their customers.

For one, IoT-enabled sensors can help minimize electricity consumption and improve the safety of the tunnel. In addition, IoT-enabled sensors can detect whether a vehicle is passing through a specific area and adjust the lighting accordingly. This can save electricity and money during low traffic times. Smart cities can make use of IoT technologies to monitor infrastructure and detect faults. With many devices and sensors connected to the internet, the city can monitor parking spaces, electrical failure, waste management, transportation, and more.

Another major benefit of IIoT is its ability to improve schedule management and process automation. It can also improve the quality of transportation systems. Various applications of the technology have been demonstrated, including speed reduction, pollution detection, and the identification of overweight and broken vehicles. These advantages are just some of the many ways in which IoT can improve transportation systems.
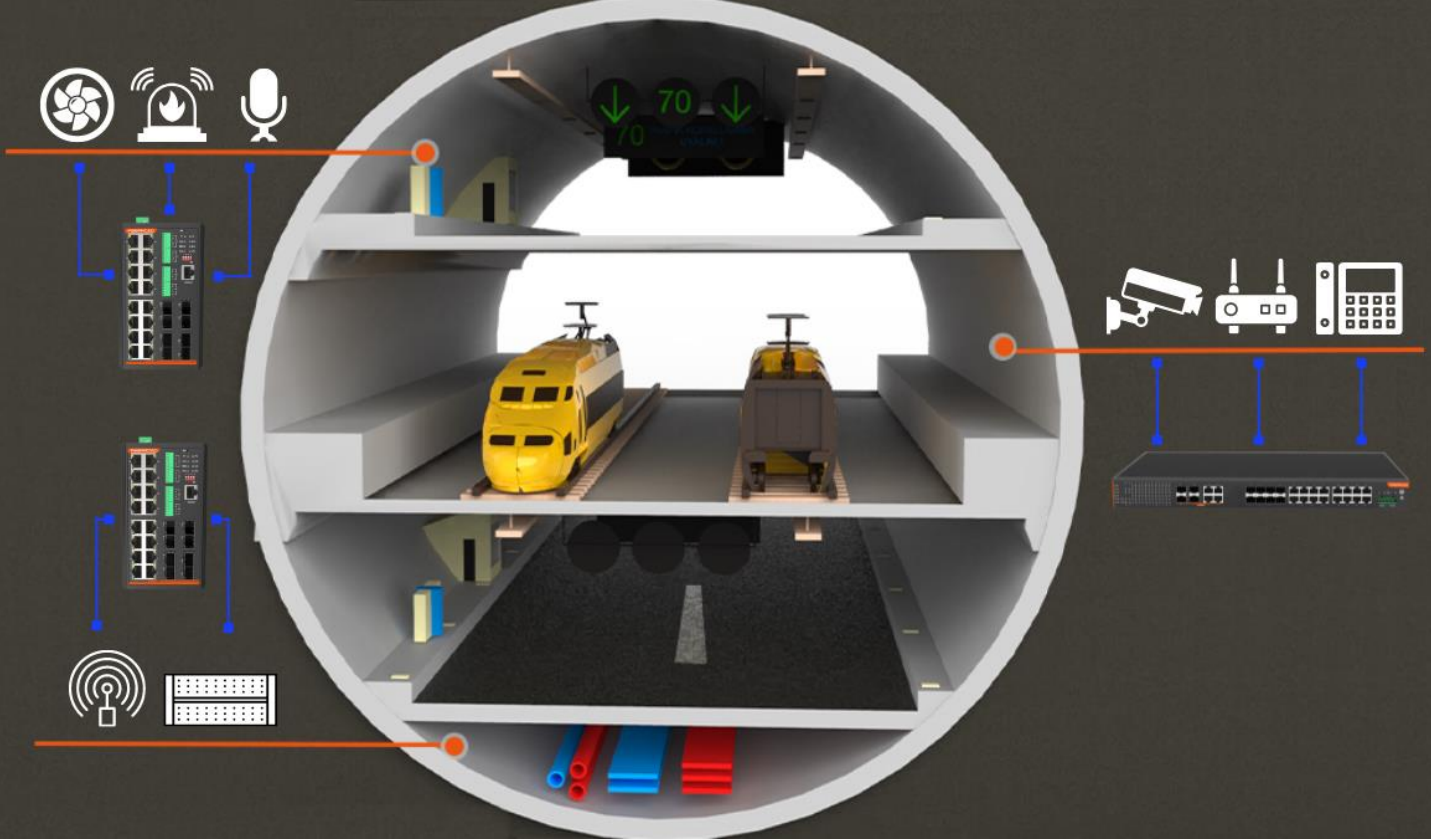
Fiberroad Industrial Ethernet Switch for Smart Utility Tunnels Solution

FR-7M3408BT
Layer 2+ Managed Industrial Ethernet Switch

- 8x10/100/1000BASE-TX RJ45
- 4x100/1000BASE-X SFP
- Port 1-8 support PoE/PoE+/PoE++
- STP/RSTP/MSTP/ERPSv2
- PoE output power allocation, Scheduling of PoE operation
- IPv4/IPv6 Management/Static Route
- WebGUI/NMS/CLI/CloudMQTT

FR-7M3420S
Layer 2+ Managed Industrial Ethernet Switch

- 20x10/100/1000BASE-TX RJ45
- 4x100/1000BASE-X SFP
- 4xRS232/422/485 Serial Port
- STP/RSTP/MSTP/ERPSv2
- Integration of Modbus TCP and Modbus RTU/ASCII networks
- IPv4/IPv6 Management/Static Route
- WebGUI/NMS/CLI/CloudMQTT

FR-9M448F
Layer 3 Managed Industrial Switch

- 16x10/100/1000BASE-TX RJ45
- 8x100/1000BASE-X Combo
- 4x10GbE SFP+
- STP/RSTP/MSTP/ERPSv2/OSPFv2v3/RIPv1v2
- TACACS+, SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security
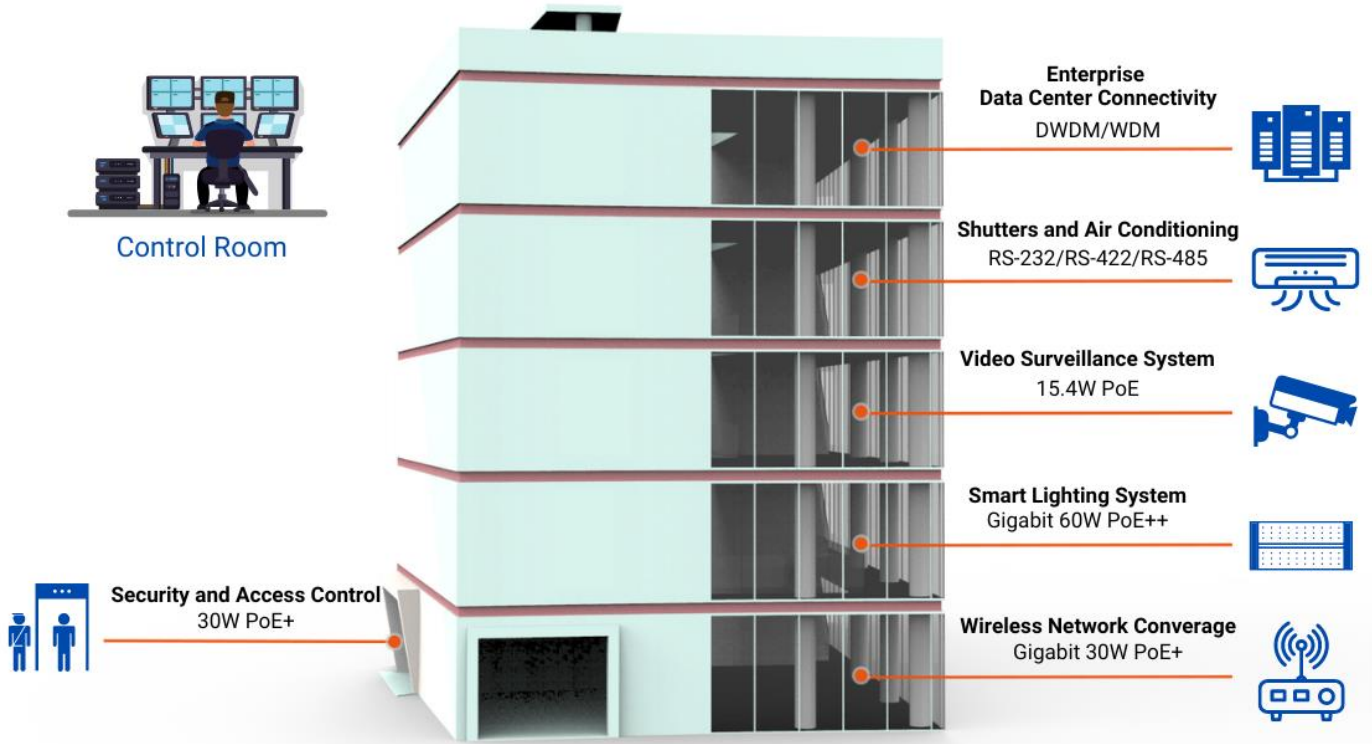- WebGUI/NMS/CLI

How Smart Building Works

With the advent of smart buildings, building owners are gaining more control over their spaces. This technology allows building owners to adjust air flow, temperature, and humidity levels based on occupancy data. In addition, it can cut thousands of dollars off their electricity bill. It can also help to reduce the carbon footprint of a building. Buildings are responsible for a huge amount of the energy consumed in our society. Luckily, new technology can be implemented into old buildings and make them more efficient.

The technology behind smart buildings relies on sensors that continuously collect data and send them to a central management system. The system analyses the data in real-time and makes adjustments to optimize the building's performance. This enables smart buildings to be more energy efficient and reduce the impact on the environment. The use of sensors in smart buildings also improves occupant health and safety.

The technology in smart buildings can also detect where energy is wasted. It can automatically switch on or off mechanical systems, and can even detect when power is out. This technology can also make occupants safer by sensing power outages before they occur. Furthermore, it can guide elevators to the nearest floor when an emergency occurs. Predictive maintenance can prevent unexpected downtime and improve productivity. It uses sensors to monitor equipment usage and match the data to predictive models. Using this data, predictive algorithms can detect subtle abnormalities and patterns, and prevent wear and tear by avoiding over or under-using equipment.

Smart buildings can be connected to your building's IT network. By using the data gathered from the sensors, you can optimize space by reducing electric lighting, turning off unnecessary lights, and adjusting shades for better natural lighting. These features help your building become more energy efficient and meet strict regulations regarding greenhouse gas emissions. They can also help you operate more efficiently and minimize your staff's time.

Control Room

Enterprise
Data Center Connectivity
DWDM/WDM

Shutters and Air Conditioning
RS-232/RS-422/RS-485

Video Surveillance System
15.4W PoE

Smart Lighting System
Gigabit 60W PoE++

Security and Access Control
30W PoE+

Wireless Network Converage
Gigabit 30W PoE+

Fiberroad Evolving PoE Accommodates Higher-Power Smart Building Solution

FR-5A3224P
Unmanaged AI PoE Switch

■ 24x10/100/1000BASE-TX + 2x Gigabit SFP
■ Port 1-24 IEEE 802.3af/at Standard
■ Support 10K bytes jumbo frame
■ IEEE802.3az Energy Efficient Ethernet Technology
■ DIP Switch Support AI QoS/AI Extend/AI VLAN/AI PoE
■ Plug and play, no software configuration

FR-5M3208P
Layer 2+ Managed PoE Switch

FR-5M3424P
Layer 2+ Managed PoE Switch

■ IEEE 802.3af/at/bt PoE Standard
■ Advanced PoE management
■ Priority system for PoE Port
■ Full gigabit L2+ Ethernet Network
■ Build up a redundant PoE network
with STP/RSTP/MSTP/ERPSv2
■ RADIUS, IEEE 802.1X, SNMPv3, HTTPS
and SSH to enhance network security
■ Easy-to-use WebGUI network management interface

Benefits Of Powering Smart Building With PoE

Power over Ethernet (PoE) is a versatile, cost-effective solution for powering smart buildings. Its flexibility enables flexible placement of devices, such as IP cameras, in locations that are not always accessible to AC outlets. It also provides increased safety and reliability, as it eliminates the risk of power outages and overloads. With these benefits, it is becoming the technology of choice for smart buildings.

PoE is becoming a popular option for residential buildings, as more developers are turning to it to create a safer, more efficient, and more future-proof environment for occupants. According to the National Fire Protection Association (NFPA), electrical equipment is the third leading cause of home fires. It also protects against over-powering, under-powering, and improper installation by ensuring that power is generated from a central source. In addition, it can be easily controlled to quickly turn off or reset devices.

The use of power over Ethernet is a growing trend in buildings, as more devices become connected to the Internet. With PoE, it is possible to deliver power and data on the same cable, reducing the need for separate power supplies. This technology makes it a natural choice for buildings that use Ethernet as the primary communication medium.
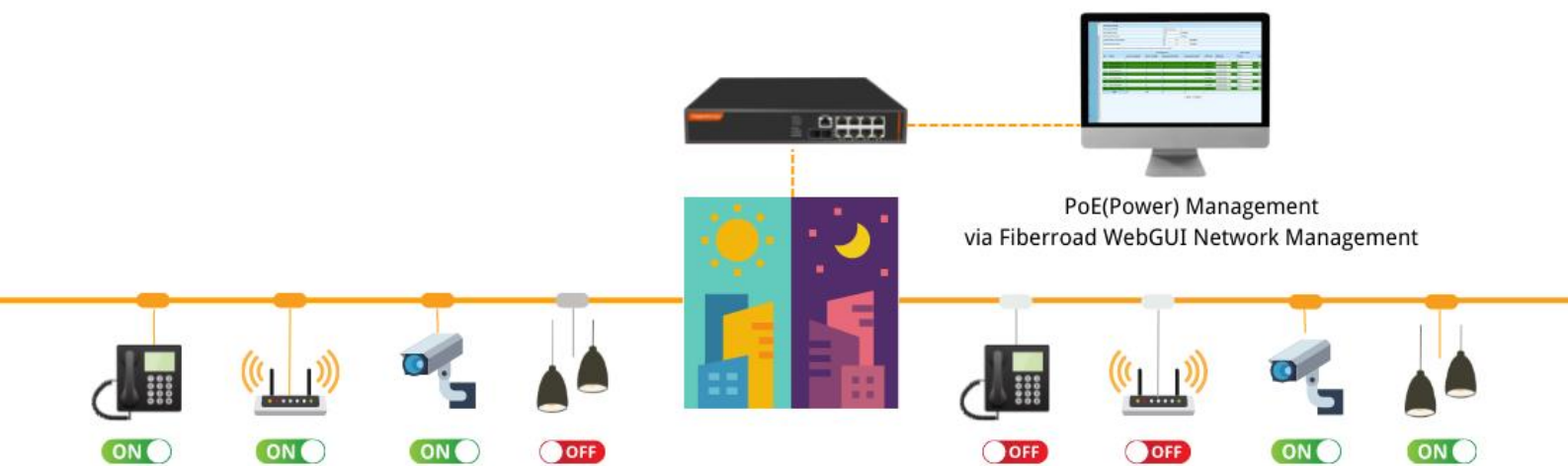

Figure: PoE Scheduling Feature

Smart Street Lamppost Solution

How Industrial Ethernet Benefits IIoT

Industrial Ethernet connects a wide range of devices and processes, including machines and plants, to share information and make the most of available resources. This allows manufacturers to optimize processes and minimize costs by monitoring asset conditions and performance. IIoT can also improve quality and control, as the data collected by connected sensors can be analyzed to identify errors or wastage.

In addition to improving operational efficiency, IIoT can boost revenue and profitability. Increasingly, manufacturers are looking for ways to reduce the amount of time and money spent on maintenance and repair. By implementing IIoT, they can monitor and maintain their products in the field and use remote diagnostics to identify problems before they escalate to the point of failure.

By enabling the connection of a large number of devices, IIoT improves efficiency, allowing organizations to gain a competitive advantage through improved efficiency and improved service operations. By leveraging the power of this connectivity, manufacturers can develop new products and services. They can offer predictive maintenance and continuous uptime, enabling them to offer new services and products.

How Does Smart Streel Lamppost System Work?

Smart street poles are equipped with all the necessary features to monitor traffic, safety and security. They can also act as a hub for smart applications. For example, they can be used to charge electric vehicles or display digital signage. In addition, they can help reduce light pollution and CO_2 emissions by automatically turning street lights on and off.

The street light controller originates commands that control the LED driver. This means that the system is able to dim lights in real-time when their presence is detected. This feature is especially useful for adaptive lighting, where the lights can adjust their output in response to changing conditions. A typical street light controller may consist of a simple control circuit or a microprocessor. It can be built into the pole or the luminaire.

The system combines intelligent motion sensors to optimize vehicle and pedestrian traffic flow. It also features a DHT11 temperature-humidity sensor, which collects temperature and humidity information. This information is sent to a cloud platform that controls the street lights. It dims or brightens the lights based on the data it receives. This allows it to be customized to different situations.
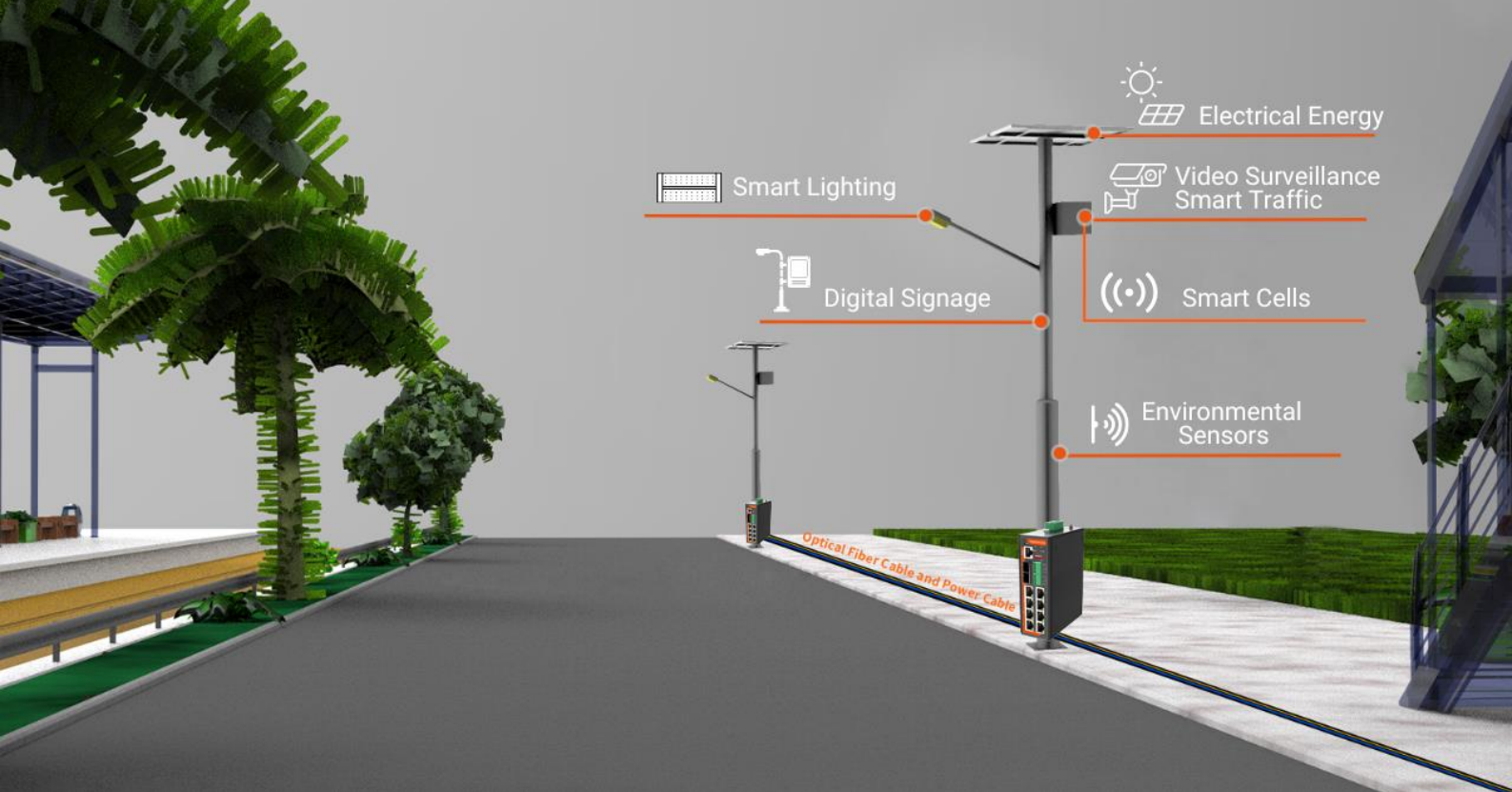
## How Fiberroad Industrial Network Switch Benefit Smart Street Lamppost System

FR-7M3208SBT
Layer 2+ Managed Industrial Ethernet Switch

- 8x10/100/1000BASE-TX RJ45
- 2x100/1000BASE-X SFP
- 2xRS232/422/485 Serial Port
- STP/RSTP/MSTP/ERPSv2
- Integration of Modbus TCP and Modbus RTU/ASCII networks
- IPv4/IPv6 Management/Static Route
- WebGUI/NMS/CLI/CloudMQTT

MQTT and Industrial Network Switch, How they fit together?
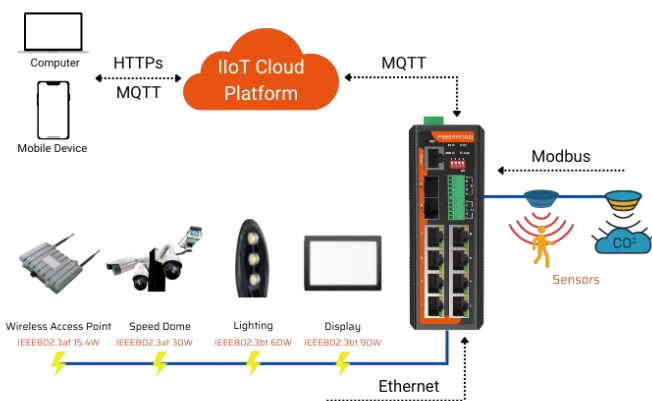
MQTT is a protocol that allows connected devices to send and receive messages. This protocol uses topics to define different types of messages. For example, a smart home could designate a different topic for each room. The device would then subscribe to that topic and receive messages. This protocol allows developers to create custom topics to manage data from various connected devices.

An MQTT topic is a UTF-8 string that contains one or more topic levels. Topics make sending and receiving data through MQTT simpler than message queues. MQTT is a messaging protocol that uses the publish-subscribe model. It can send messages from one application or device to another. This communication is conducted over TCP/IP. Unlike a client-server model, MQTT uses a broker to distribute messages to multiple clients. In the regular client-server model, server and client communication are limited. The MQTT protocol utilizes TCP/IP connections to connect to a broker.

Smart Parking Solution
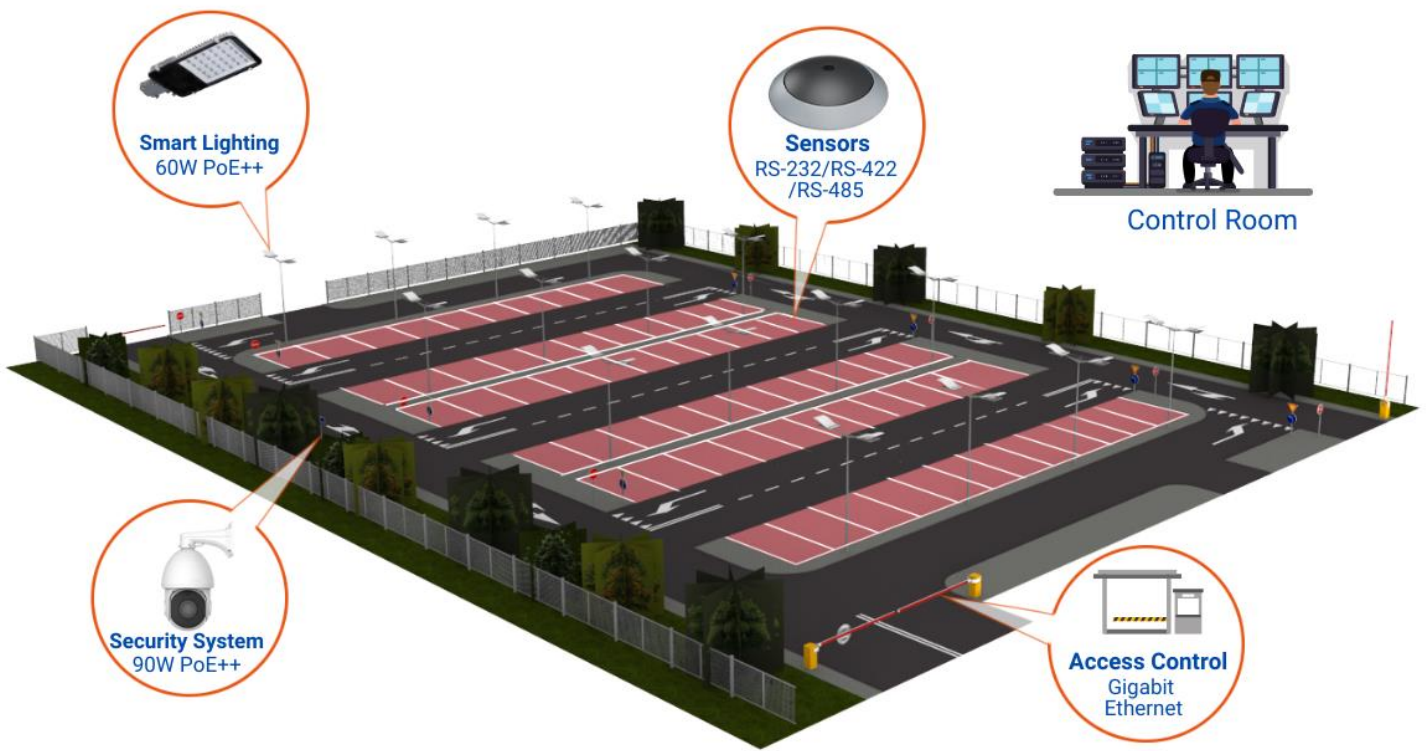
What Is An IoT-Based Parking System?

An IoT Based smart parking system uses artificial intelligence, machine learning, and Augmented Reality (AR) to manage parking facilities. These technologies will help parking systems increase efficiency and address urbanization challenges. The key to successful IoT implementation is to ensure it is fault-tolerant and cost-effective.

IoT Based smart parking systems are cloud-based systems that can monitor parking availability and send real-time updates to the end user. They can also be used to reduce traffic congestion and improve fuel efficiency. They include sensors that track the locations of vehicles and ultrasonic sensors that can detect parked vehicles. These systems also use a processor-on-chip to relay data to cloud platforms.

How Does IoT-Based Parking System Work?

An IoT Based smart parking system can be an effective way to manage parking spaces in parking lots. The system is comprised of sensors, gateways, and a cloud platform. The hardware and software components of an IoT-based smart parking system depend on the size of the parking lot, the number of parking slots, and the location of the parking area. The architecture of an IoT system will also depend on how mobile and web applications will be used. Usually, an IoT specialist will select the best hardware and software for your parking lot.

The system uses sensors that detect when a parking space is occupied or free. It also detects if the parking spot is dirty, which is important if the parking spot is in an area where dirt is an issue. The sensors can be controlled through a web application. The web application can then send a signal to a Lambda function that reads the sensor state values from the AWS IoT shadow. This function can then display available parking spaces based on their state. Typically, green color indicates an unoccupied parking space, while red and yellow colors indicate a space that is occupied.

Smart Lighting 60W PoE++

Sensors RS-232/RS-422 /RS-485

Control Room

Security System 90W PoE++

Access Control Gigabit Ethernet

How Fiberroad Industrial Network Switch Benefit Smart Parking System

FR-7M3408BT
- 8x10/100/1000BASE-TX RJ45
- 4x100/1000BASE-X SFP
- Port 1-8 support PoE/PoE+/PoE++
- STP/RSTP/MSTP/ERPSv2
- PoE output power allocation, Scheduling of PoE operation
- IPv4/IPv6 Management/Static Route
- WebGUI/NMS/CLI/CloudMQTT

FR-7M3424
- 24x10/100/1000BASE-TX RJ45
- 4x100/1000BASE-X SFP
- STP/RSTP/MSTP/ERPSv2
- PoE output power allocation, Scheduling of PoE operation
- IPv4/IPv6 Management/Static Route
- WebGUI/NMS/CLI/CloudMQTT

Why IoT-Based Smart Parking System Is Needed?

An IoT Based smart parking system is a modern way of managing parking space. It uses sensors and smartphones to give real-time feedback to users. It can include cameras, counters on parking lot doors, and sensors embedded in paved areas. Using this system, users can access available parking slots through a mobile application or web portal.

A smart parking system is a crucial element of smart city planning and management. It can make a city safer and reduce traffic jams, as well as increase citizen engagement. With the help of IoT and connected technology, cities can make their parking spaces safer for residents and improve response times. Smart parking is the backbone of a smart city and an IoT Based smart parking system will allow drivers to save valuable time. The system should also be able to incorporate license plate scanners and GPS.

What Is Smart City Surveillance?

Smart cities are those that implement information technology to improve efficiency and sustainability. These cities also lower costs. Surveillance is one of the most common applications of smart city technology. Smart city surveillance systems can help identify and prevent crime, improve city safety, and protect the environment. These systems can be used in residential, commercial, and public places.

Smart city surveillance is not a new concept. Cities all over the world are already deploying surveillance technology, including facial recognition and automatic data mining. This multibillion-dollar industry has spurred concerns about the right to privacy in cities. While smart cities offer a lot of benefits, including cleaner energy solutions, lower friction mobility, and safer streets, they also raise privacy concerns.

Smart city surveillance can be used to improve public safety by detecting situations before they happen. It can also help municipal authorities manage crowds during public events. The system can detect crowds, count people, and track down criminals. Smart city surveillance systems can also cut commuting times by monitoring traffic in real time.

While smart city technology can improve urban mobility, some advocates argue that it also fosters the growth of a surveillance state. Although smart cities have been in use for nearly a decade, advocates are turning a critical eye toward the technology. Some of these projects may just be plain old surveillance, and the risks involved are too high.

How Fiberroad Industrial Network Switch Benefit Smart Parking System

FR-7N3104P

Unmanaged Industrial PoE Switch

- 4x10/100/1000BASE-TX RJ45
- 1x1000BASE-X SFP
- Port 1-4 support PoE/PoE+

FR-7N3008BT

Unmanaged Industrial PoE Switch

- 8x10/100/1000BASE-TX RJ45
- Port 1-4 support PoE/PoE+/PoE++
- 10K Jumbo Frame

FR-7M3208L

Layer 2+ Managed Industrial Ethernet Switch

- 8x10/100/1000BASE-TX RJ45
- 4x100/1000BASE-X SFP
- STP/RSTP/MSTP/ERPSv2
- IPv4/IPv6 Management/Static Route
- WebGUI/NMS/CLI/CloudMQTT

FR-2703

Industrial Fiber Media Converter

- 1x10/100/1000BASE-TX RJ45
- 1x1000BASE-X SFP
- 10K Jumbo Frame

More Information on Our Products

Unmanaged
Industrial Ethernet Switch Series

- Fast Ethernet or Gigabit Ethernet
- Optionally support PoE/PoE+/PoE++
- -40 to 75℃ Operating Temperature
- Support either DIN Rail or Wall Mounting

Managed Lite
Industrial Ethernet Switch Series

- Fast Ethernet or Gigabit Ethernet
- Optionally support PoE/PoE+/PoE++
- -40 to 75℃ Operating Temperature
- Support either DIN Rail or Wall Mounting
- STP/RSTP/VLAN/QoS
- WebGUI Management
- -40 to 75℃ Operating Temperature
- Support either DIN Rail or Wall Mounting

Layer 2+ Managed
Industrial Ethernet Switch Series

- Fast Ethernet or Gigabit Ethernet
- Optionally support PoE/PoE+/PoE++
- -40 to 75℃ Operating Temperature
- Support either DIN Rail or Wall Mounting
- STP/RSTP/MSTP/ERPSv2
- WebGUI/NMS/CLI Network Management
- -40 to 75℃ Operating Temperature
- Support either DIN Rail or Wall Mounting

Layer 2+ Managed
Industrial Network Switch Series

- Fast Ethernet or Gigabit Ethernet
- Optionally support PoE/PoE+/PoE++
- -40 to 75℃ Operating Temperature
- Support either DIN Rail or Wall Mounting
- STP/RSTP/MSTP/ERPSv2
- WebGUI/NMS/CLI Network Management
- -40 to 75℃ Operating Temperature
- Rack Mounting

Layer 3 Managed
Industrial Network Switch Series

- 24G+4x10GbE
- support PoE/PoE+/PoE++
- -40 to 75℃ Operating Temperature
- Support either DIN Rail or Wall Mounting
- STP/RSTP/MSTP/ERPSv2/ OSPFv2v3/RIPv1v2
- WebGUI/NMS/CLI Network Management
- -40 to 75℃ Operating Temperature
- Rack Mounting

More Information on Our Products

Unmanaged
### AI PoE Switch Series

- 24x10/100/1000BASE-TX + 2x Gigabit SFP
- Support IEEE 802.3af/at Standard
- IEEE802.3az Energy Efficient Ethernet Technology
- DIP Switch Support AI QoS/AI Extend/AI VLAN/AI PoE
- Plug and play, no software configuration
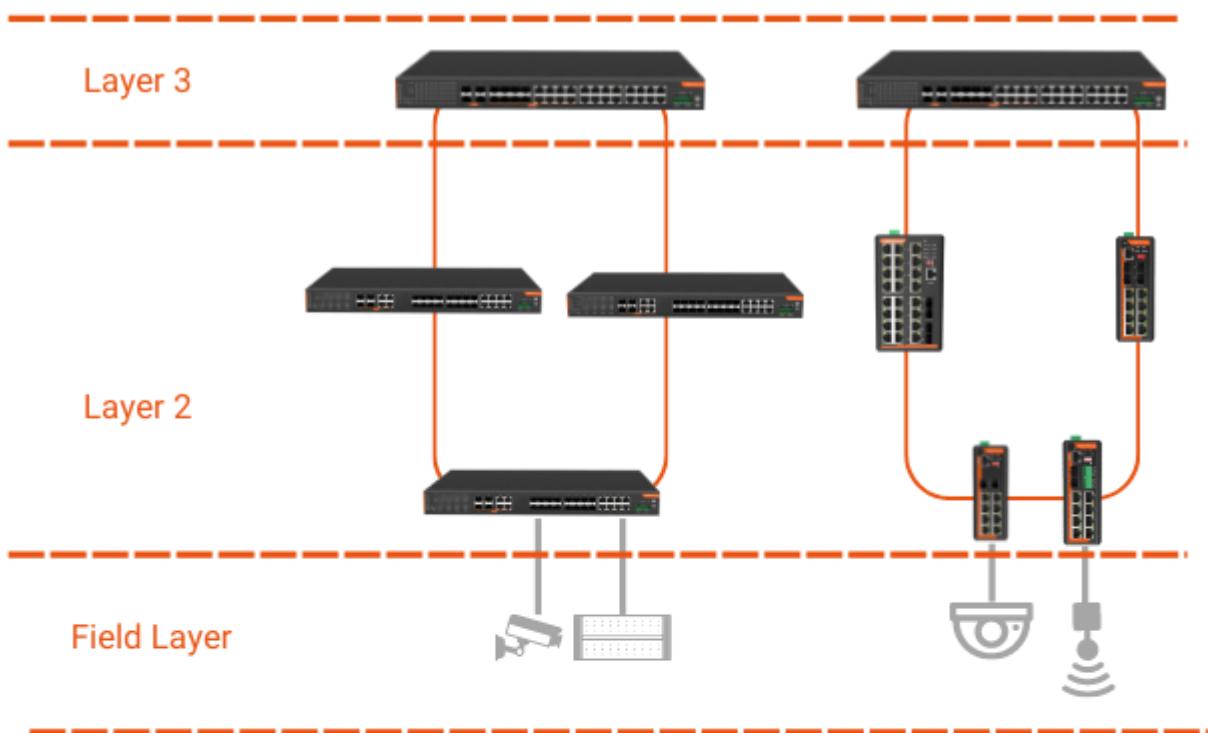
Layer 2 + Mananaged
PoE Switch Series

- IEEE 802.3af/at/bt PoE Standard
- Advanced PoE management
- Priority system for PoE Port
- Full gigabit L2+ Ethernet Network
- Build up a redundant PoE network
with STP/RSTP/MSTP/ERPSv2
- RADIUS, IEEE 802.1X, SNMPv3, HTTPS
and SSH to enhance network security
- WebGUI/NMS/CLI Network Management
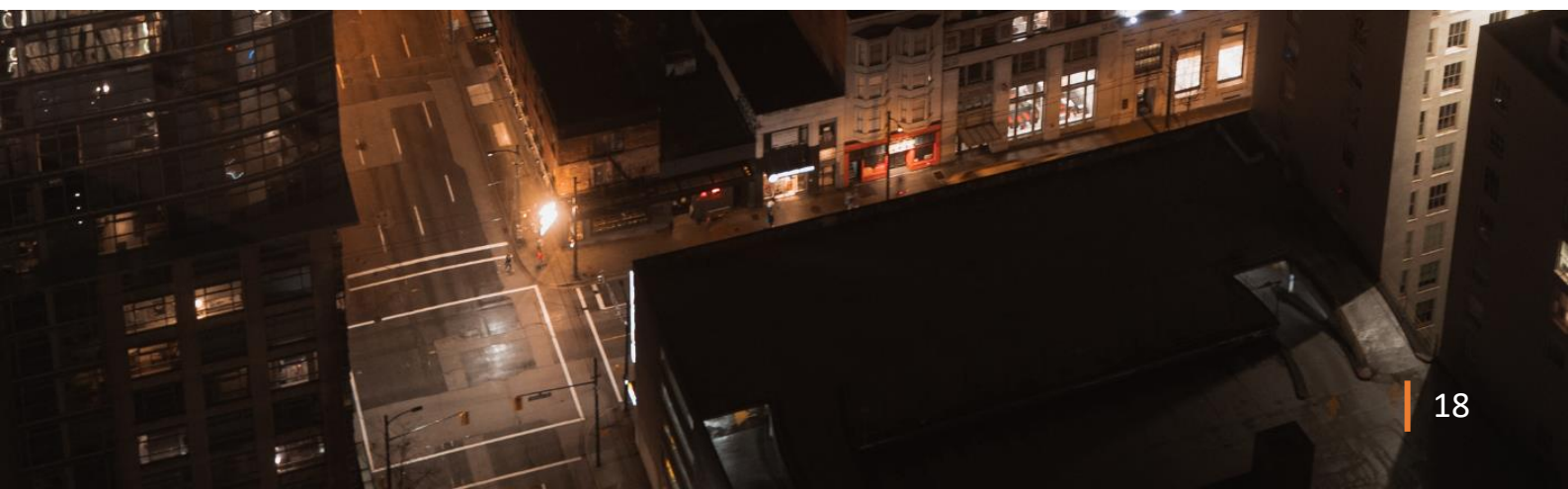
Network Management Platform

Fiberroad Network Management platform is the best way to manage Fiberroad Industrial Managed Switches. It has been specifically designed to facilitate and simplify the network configuration and maintenance experience, that usually requires repetitive work if done manually. NMS can be installed on any computer connected to the network. Although based on Simple Network Management Protocol (SNMP) for management and configuration, it is able to review in real time events and logs to Syslog servers and provide to the network operator full awareness on the health of the network and the elements needed for decision making.

Web Management

Web-based Network Management System

Web-based Cloud Management

Layer 3

Layer 2

Field Layer

FIBERROAD