

# Inscape Data's Innovative Outdoor PoE Switch Solutions

White Paper

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## Introduction

Founded in 2004, Inscape Data Corporation has been at the forefront of outdoor Power over Ethernet (PoE) solutions. The company's commitment to innovation, reliability, and performance is reflected in its patented All-in-One-Box outdoor PoE switch solutions, which have transformed industries such as smart cities, video surveillance, and WISP (Wireless Internet Service Providers). Inscape Data's outdoor PoE systems are designed to operate efficiently in harsh environments while offering a scalable, durable, and cost-effective solution for modern network infrastructure.

This white paper provides insights into Inscape Data's patented technologies, highlighting their weatherproof enclosures, high-power PoE switches, and modular designs that simplify network deployment and management in outdoor extreme weather environments.

## Benefits

The primary advantage of outdoor PoE switches is their ability to provide power and data over a single cable, eliminating the need for separate power cables and reducing the cost and complexity of wiring. In addition, PoE switching offers higher reliability than traditional wired solutions since it relies on Ethernet signaling, the most reliable and well-tested transmission protocol.

Outdoor PoE switches are also easier to deploy and can be installed anywhere. This makes them ideal for communication networks in smart cities, as they can extend coverage to often hard-to-reach areas without the need for additional wiring. Furthermore, PoE switches are more secure than traditional wireless networks since they don't require a wireless signal and are immune to wireless interference. They also support advanced features such as advanced traffic management, quality of service (QoS), and more.

## Reliability and Scalability

Outdoor PoE switches are designed with reliability and scalability in mind, making them suitable for the most demanding applications. The switches support advanced features such as rack-level redundancy, providing backup in case of system failure or power loss. They also support multiple advanced QoS settings so that large amounts of traffic can be efficiently distributed over a network. Furthermore, they are designed to support high-speed data transmission, enabling rapid and secure access to data. Finally, PoE switches are scalable and can be adapted as networks and applications grow.

## Inscape Data's All-in-One-Box Outdoor PoE Solutions

An All-in-One-Box PoE switch solution is a compact, integrated system combining Power over Ethernet (PoE) technology and network switching capabilities within a single, durable, weatherproof enclosure. These solutions are engineered for outdoor applications where power delivery and data transmission are required over a single Ethernet cable, especially in harsh environmental conditions such as extreme temperatures, dust, water, and physical elements.

Key Features of All-in-One-Box PoE Switch Solutions:

1. Integrated Power and Data Delivery:

These solutions allow power and data to be transmitted over a single Ethernet cable, reducing the need for separate power cables and simplifying installation. This makes it ideal for powering outdoor devices such as security cameras, wireless access points, and IoT devices.

2. Weatherproof Design:

The IP67/IP68-rated weatherproof enclosures protect the internal components from water, dust, and extreme temperatures. This makes the systems suitable for outdoor environments like smart cities, industrial sites, and WISP networks.

3. Modular and Flexible:

Inscope Data's All-in-One-Box solutions feature a modular design, allowing easy installation and component replacement. Network operators can swap out PoE switches, routers, and other devices without complex reconfiguration. This flexibility supports future-proofing and scalability.

4. High-Power PoE Capabilities:

These systems are designed to support PoE++ (IEEE 802.3bt), which delivers up to 90W per port, making them ideal for powering high-power devices such as PTZ cameras and high-bandwidth access points. This allows for deploying more advanced outdoor devices that require higher power.

5. LinkPower™ Technology:

Remote Reboot Capability:

One of the most important features of LinkPower™ Technology is the ability to reboot network devices powered by PoE remotely. This eliminates the need for on-site manual intervention when devices freeze or malfunction, reducing operational downtime and maintenance costs.

PoE Monitoring:

LinkPower™ enables real-time monitoring of PoE-powered devices. It allows administrators to track power consumption, device status, and performance metrics. This feature ensures that devices such as security cameras, wireless access points, and other IoT devices operate efficiently and alerts administrators to potential issues before they escalate.

Enhanced Network Control:

LinkPower™ provides remote control over network switches, allowing adjustments to power levels, scheduling power cycling, and other custom configurations to optimize network performance. This flexibility is especially useful in remote locations or where access is difficult.

Optimized for Harsh Environments:

The technology is specifically designed for outdoor networks deployed in harsh environments. It ensures reliable operation even in areas exposed

to extreme temperatures, humidity, or dust, making it essential for applications such as smart cities, industrial sites, and WISP deployments.

□ Scalability and Future-Proofing:

LinkPower™ Technology supports a wide range of PoE devices and allows networks to scale efficiently. It can manage low-power seamlessly and high-power PoE++ devices (up to 90W), making it a future-proof solution for evolving network infrastructures.

□ Reduced Maintenance Costs:

By enabling **remote troubleshooting** and **self-diagnostics**, LinkPower™ minimizes the need for on-site technical staff, reducing operational expenses and improving response times to network issues.

6. Hotel Space for Customization:

A unique feature in Inscape Data's patented design is the inclusion of hotel space inside the enclosure. This space allows users to install additional electrical components such as IoT devices, sensors, or other accessories without compromising the integrity of the enclosure or its weatherproof features.

7. Cost Efficiency:

By using standard electrical connectors inside the weatherproof enclosures, these systems reduce costs compared to traditional outdoor solutions that often require expensive, specialized components for weatherproofing.

In summary, the All-in-One-Box PoE switch solutions by Inscape Data offer a versatile, durable, and scalable approach to outdoor network infrastructure. They simplify deployment, enhance flexibility, and reduce costs while ensuring reliable power and data transmission in demanding environments.

## Key Features of Inscape Data's Outdoor PoE Solutions:

1. **Durability and Weatherproofing:** Inscape Data's IP67/IP68-rated enclosures offer superior protection from dust, water, and extreme temperatures. These robust enclosures ensure long-term durability and reliability in outdoor environments, including urban, rural, and industrial settings.
2. **Modular Design:** Inscape Data's enclosures' modular architecture allows for easy installation, maintenance, and upgrading. Without extensive reconfiguration, network operators can replace or upgrade components, such as PoE switches, routers, and wireless access points. This modularity significantly reduces costs while enhancing deployment flexibility.

3. **High-Power PoE:** Inscape Data's PoE switches support PoE++ (IEEE 802.3bt) and delivers up to 90W per port. This high-power output makes them ideal for powering PTZ cameras, access control systems, and IoT sensors, ensuring reliable power and data transmission for even the most power-hungry devices.
4. **LinkPower™ Technology:** Inscape Data's proprietary LinkPower™ technology enhances network performance with remote reboot and PoE monitoring capabilities. These features enable real-time troubleshooting, reducing the need for on-site maintenance and improving overall network uptime.
5. **Cost-Effective Weatherproofing:** Inscape Data's patented designs offer significant cost savings by eliminating the need for rubberized jacks and other costly weatherproofing components. The use of standard connectors further reduces manufacturing and assembly costs.

## Patented Weatherproofing for Outdoor Networks

Inscape Data's innovative weatherproof enclosures feature several patented technologies that provide robust protection for outdoor network devices. One of the company's most important innovations is the tubular weatherproofing system outlined in Patent IC10102A, which ensures that power and data lines remain shielded from water, dust, and other environmental factors.

### Key Features of the Patented Design:

1. **Tubular Design:** The tubular weatherproofing system uses flexible PVC or rubber tubes to protect multiple electrical lines. This design eliminates the need for costly, specialized, watertight connectors by using standard electrical jacks, significantly reducing installation and maintenance costs.
2. **Multi-Hole Gland:** Another innovation in Inscape Data's design is the multi-hole gland, which allows multiple cables to pass through the enclosure while maintaining a weatherproof seal. This flexible design ensures that cables remain protected without compromising the enclosure's integrity.
3. **Hotel Space for Additional Components:** A distinctive feature of Inscape Data's patented enclosure design is the inclusion of hotel space, a dedicated area within the enclosure where customers can install their additional electrical components. This space allows users to add custom accessories, such as IoT devices, wire adapters, or other electronics, without compromising the enclosure's weatherproofing. The hotel space

allows for future-proofing of the network by accommodating new devices as network needs evolve.

## Applications of Inscape Data's Outdoor PoE Solutions

1. **Smart Cities:** Smart cities integrate Information and Communication Technology (ICT) and Internet of Things (IoT) devices to enhance urban management. These cities optimize services like traffic flow, utilities, and public safety by collecting and analyzing real-time data. Inscape Data's PoE solutions power and manage critical smart city applications such as public Wi-Fi, intelligent traffic systems, and surveillance networks. The use of PoE technology ensures seamless operation, scalability, and efficiency in modern urban environments.

In addition to powering WIFI and IP security systems, Inscape Data's All-in-One-Box PoE solutions provide critical infrastructure support for various applications in smart cities. These include:

**Energy Efficiency:** PoE technology can power and manage smart street lighting, enabling cities to remotely control lighting schedules and adjust brightness based on real-time needs. This results in significant energy savings and reduced operational costs.

**Traffic Management:** PoE-enabled sensors can monitor real-time traffic flow and congestion, feeding data to centralized management systems. This allows for more efficient traffic routing and reduced environmental impact, ultimately improving the overall transportation experience in smart cities.

2. **Video Surveillance:** For video surveillance systems, Inscape Data's PoE++ switches provide the high-power output needed for PTZ cameras and other advanced surveillance systems. The solutions ensure uninterrupted video feeds even in extreme weather conditions, making them ideal for public safety and commercial surveillance networks.

In remote or difficult-to-reach locations, Inscape Data's PoE solutions offer enhanced security through uninterrupted power for surveillance systems. Some of the key use cases include:

**Remote Surveillance:** In areas without reliable power sources, PoE-enabled surveillance cameras powered by Inscape Data's All-in-One-Box PoE switches can offer continuous monitoring, ensuring the security of critical infrastructure or remote facilities.

**Critical Infrastructure Protection:** PoE solutions are ideal for securing critical infrastructure such as pipelines, electrical grids, and communication towers. These systems benefit from the reliability of PoE-powered IP cameras and other IoT devices, which can detect threats in real-time.

3. **Wireless Internet Service Providers (WISP):** WISP operators require scalable and reliable power for outdoor wireless access points, particularly in remote or rural areas where infrastructure can be limited. Inscape Data's high-power PoE switches and IP68-rated weatherproof enclosures provide a dependable solution for expanding wireless networks without the need for extensive and costly infrastructure investments.

Popular long-range wireless radios, such as the Ubiquiti airMAX series, Cambium Networks ePMP, and Mimosa B5/B11, can easily integrate with Inscape Data's PoE switches to deliver seamless connectivity over vast distances. Combined with Inscape Data's high-power PoE solutions, these radios can handle the power demands of modern WISP networks while maintaining robust performance in challenging environments.

**Ubiquiti airMAX:** A popular choice among WISP operators, airMAX radios offer long-range, high-speed wireless transmission capabilities, ideal for point-to-point or point-to-multipoint setups. Paired with Inscape Data's PoE switches, they ensure reliable connectivity even in remote locations.

**Cambium Networks ePMP:** Known for its scalability and interference tolerance, the ePMP series is widely used by WISPs to provide high-quality wireless broadband services. Inscape Data's PoE solutions offer the necessary power for ePMP radios to function optimally, ensuring consistent performance in rural deployments.

**Mimosa B5/B11:** These high-capacity radios are designed for gigabit wireless backhaul, providing long-range, high-speed connectivity across wide areas. When used with Inscape Data's All-in-One-Box PoE switches, Mimosa radios can deliver maximum throughput while benefiting from the durability and weatherproof protection of the IP68 enclosures.

Inscape Data's PoE switches power these high-performance radios and simplify network management through features like remote reboot and PoE monitoring, reducing maintenance and operational costs. This makes them an ideal choice for WISP networks looking to extend coverage without the need for additional expensive infrastructure.

## Conclusion

Inscape Data Corporation is a pioneer in the outdoor PoE market, delivering innovative, reliable, and cost-effective solutions that empower industries to build scalable, durable, and future-proof networks. The company's patented weatherproof enclosures, modular designs, high-power PoE switches, and the unique hotel space feature for additional components offer unmatched flexibility and durability in outdoor network deployments.

As industries and cities embrace connected infrastructures, the demand for robust outdoor PoE solutions will continue to rise. Inscape Data's commitment to innovation ensures that businesses and municipalities have the tools to build and maintain reliable, high-performance outdoor networks across various applications, from smart cities to video surveillance and WISP deployments.

This white paper underscores Inscape Data's commitment to excellence. It showcases how their patented technologies are reshaping the outdoor PoE landscape, making them the go-to solution for modern, high-performance, and scalable network infrastructure.

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Inscape Data Corporation - [sales@inscapedata.com](mailto:sales@inscapedata.com)