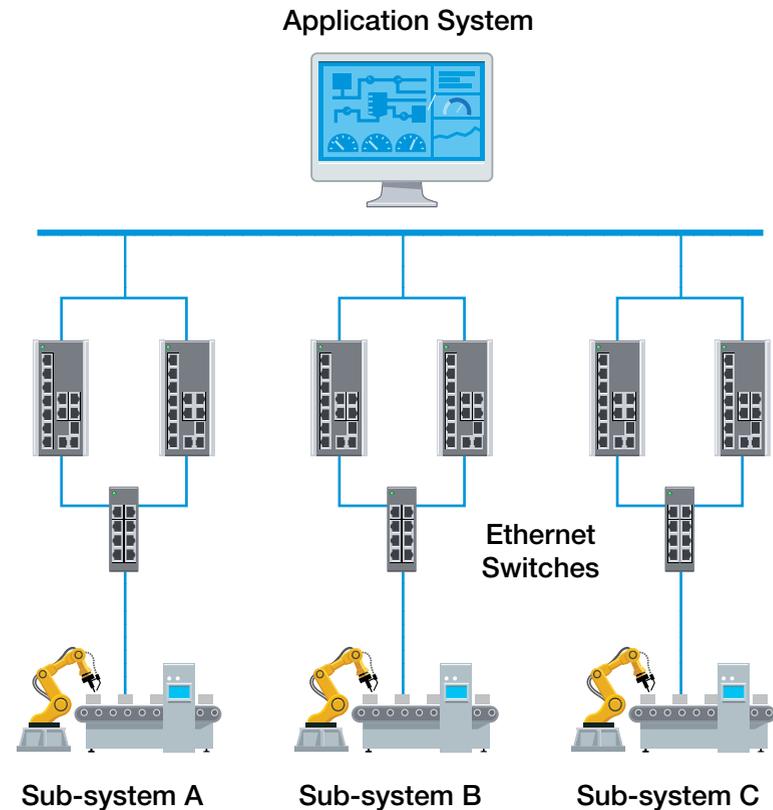


## Gear Up Your Ethernet Switches for Edge Networks

Connecting a few equipment in just one system can be hard enough. For a single automated production line, you may only need one or two Ethernet network nodes to enable connectivity so that operators in the control center can monitor the system status and respond to incidents. Now imagine the headache of connecting a growing number of devices from multiple systems into a single network. Every issue and challenge is multiplied. This is the reality faced by industrial automation engineers tasked with integrating several automated production lines across different factories. How do you ensure these devices and Ethernet nodes are connected and that operators receive the critical data they need to maintain continuous operations?

One solution is to deploy more managed Ethernet switches, which would allow you to manage your network transmissions and set related parameters according to your needs. Although managed Ethernet switches offer greater control and granularity, maintaining multiple managed switches could take a lot of time and effort. What's more, increasing the number of manageable network nodes may increase configuration and maintenance effort. Indeed, careful network planning and design are essential, so you don't outgrow your network too quickly. Alternatively, using unmanaged switches at some network nodes may also improve overall network efficiency and reduce maintenance effort.

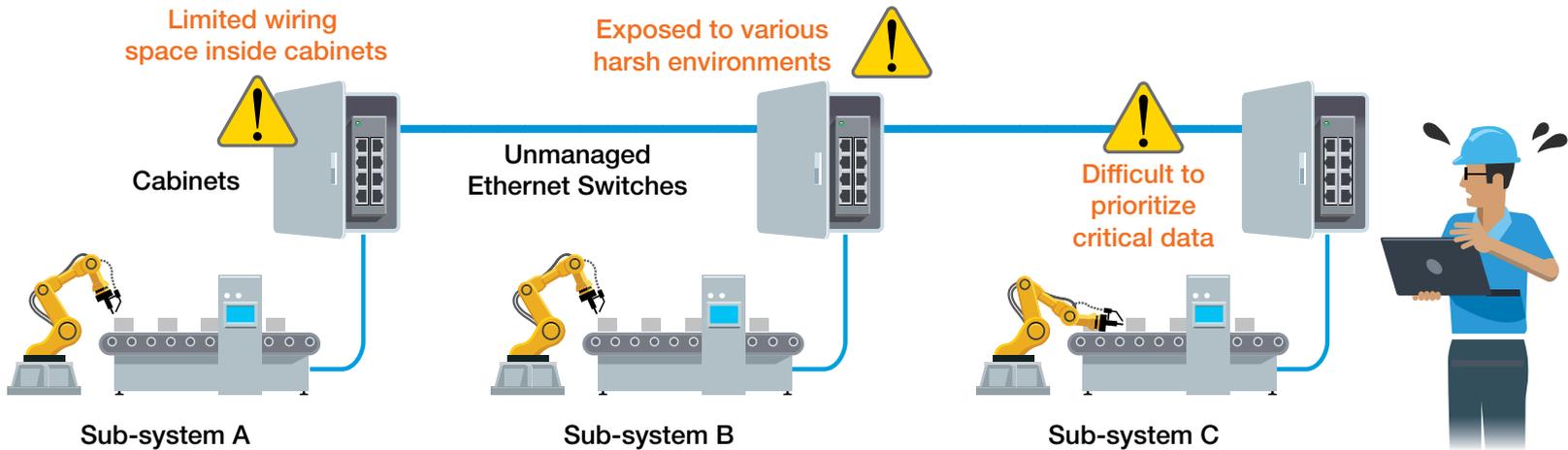


## Key Criteria for Choosing Unmanaged Ethernet Switches

Industrial operators often regard unmanaged Ethernet switches as simply network hubs for connecting field data to IP networks. When industrial operations are up and running, operators may even forget that they have unmanaged Ethernet switches on their networks. However, when more and more devices are connected to generate business insights, industrial operators may become overwhelmed by unexpected network instability. To satisfy increasing complex network requirements, unmanaged Ethernet switches need additional features. Here are some key criteria to help you choose which unmanaged switches best suit your IIoT applications.

### Key Question

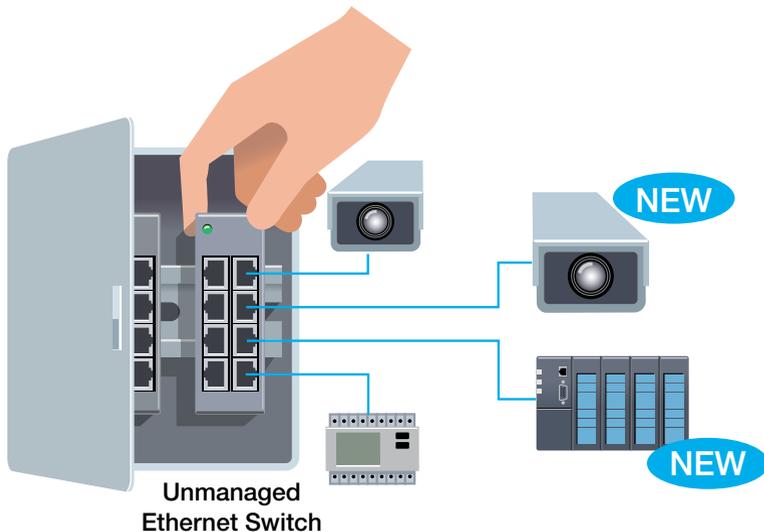
How can you squeeze an unmanaged Ethernet switch into a space-limited control cabinet that is already filled with multiple industrial devices, and still make it easy for engineers to check device and network status during operations and maintenance?





## Key Criteria 1 Plan for Expansion

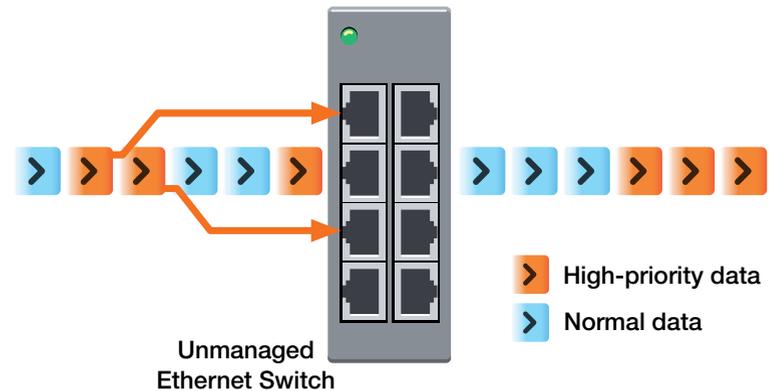
The basic requirement for ensuring your network can support a growing number of connected devices is to use unmanaged switches that have enough ports and enough bandwidth for high data volumes. Unmanaged switches are usually installed in space-limited cabinets, so using a **compact yet high-port density solution** can also save you trouble on future expansion. Another major consideration is network speed and transmission distance. Today, there are various types of data, such as video streaming, that use a lot of bandwidth and affect overall transmission speed. Unmanaged switches with Gigabit ports or fiber ports can ensure sufficient network speed for data uplinks, now and in the future.



## Key Criteria 2 Prioritize Packets at Each Node

**Quality of Service (QoS)** is a common function used to ensure that critical data is always sent with high priority. Without QoS, critical data may be delayed during transmission if the network is congested. QoS is usually supported by managed switches or certain controlling equipment, such as PLC devices, but is rarely seen on unmanaged switches. With growing demand on network nodes to transmit multiple data types from field sites, it seems reasonable to also have this function on unmanaged switches to ensure that critical data can be transmitted in time without spending extra effort and money to deploy managed switches at every node.

When choosing unmanaged switches, check if they have QoS or similar functions that prioritize critical data control so that you can keep your network simple and avoid spending too much time and effort on operating managed switches with unnecessary functions.



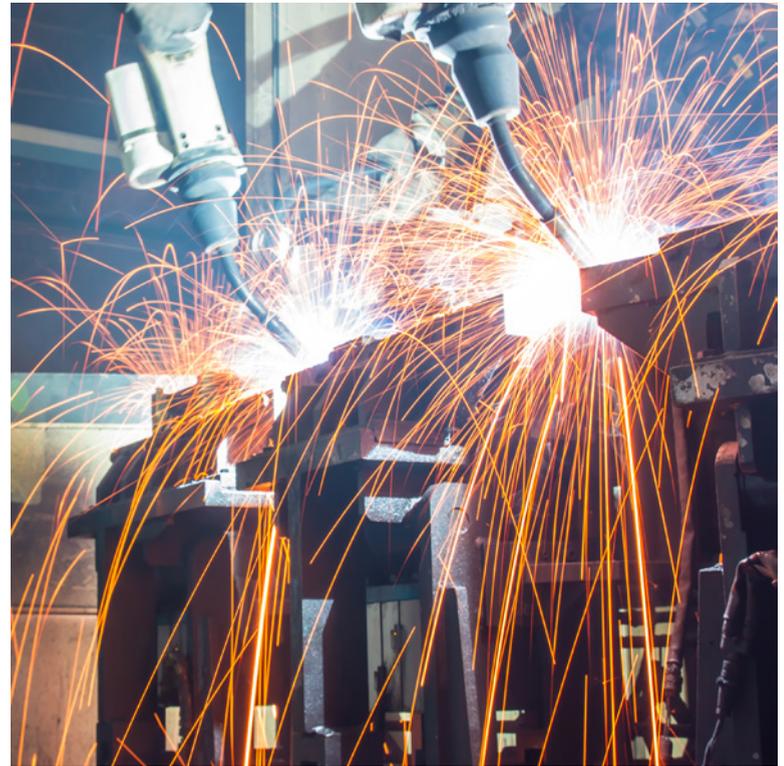


## Key Criteria 3

## Verify Reliability for Any Environment

Choosing unmanaged switches that have industry certifications for your specific application requirements is the simplest way to verify reliability. However, not all industrial applications require certifications. Nonetheless, two commonly seen environmental conditions you should know are extreme temperatures and high electromagnetic interference. Unmanaged switches featuring **wide operating temperature** and **redundant power inputs** can ensure your network operation stays up and running under harsh conditions.

In the event of an emergency, such as a power or port failure during operation, the unmanaged switches should also be able to send alerts to operators so that they can respond immediately.



## Learn More

Looking for examples of how to achieve reliable operations? Download our application notes to learn more.



Using the three aforementioned criteria to evaluate your options can help you find the right unmanaged switches for your industrial applications. To address the needs of rapidly expanding industrial networks, Moxa has developed a new series of industrial unmanaged Ethernet switches—[EDS-2000-EL Series](#), [EDS-2000-ML Series](#), and [EDS-G2000-EL/ELP](#)—that provides an extra-small footprint and reliability, easy deployment, and flexibility for a variety of industrial applications.

Expert  
Advice



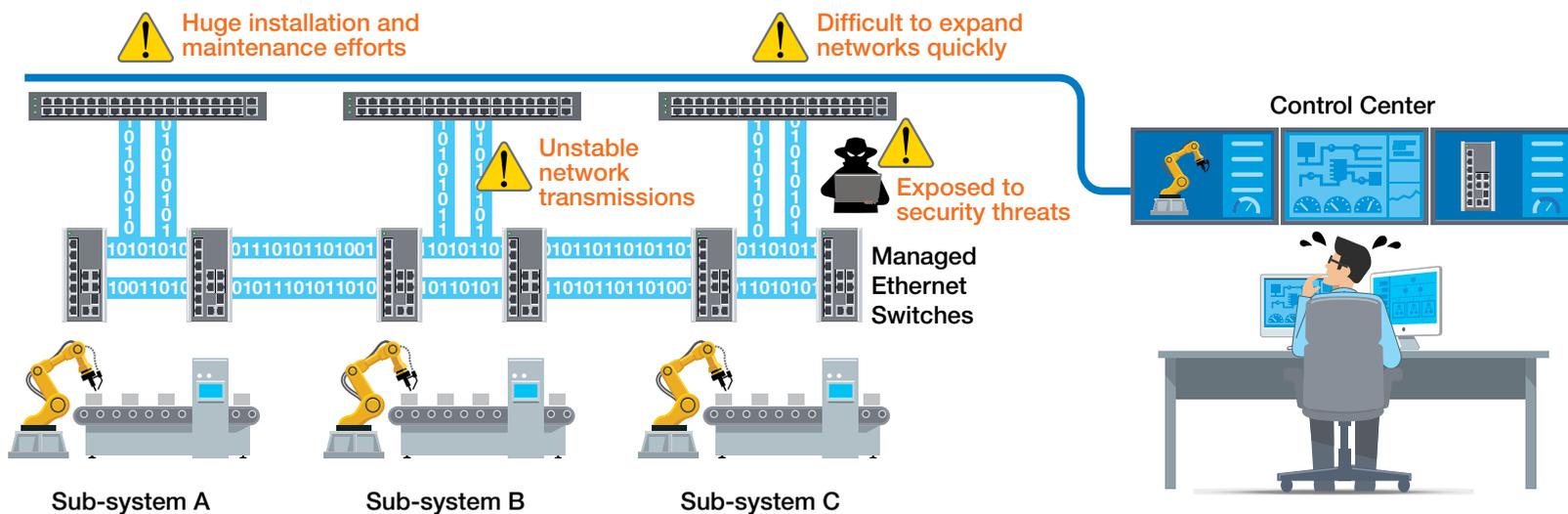
“Unmanaged switches with an extra-small footprint and managed functions, such as QoS, can help keep your network under control.”

## Key Criteria for Choosing Managed Ethernet Switches

With the trend towards Industry 4.0 and IIoT transformation in full swing, the increasing demand on network nodes to enable connected systems has become inevitable. Although some network nodes can use unmanaged switches that feature basic managed functions to minimize network complexity and administration effort, other situations may still require managed switches, which continue to play an important role in large-scale integrated networks. Your managed switches need to be smarter and more versatile than before to adapt to new changes and ensure that data can be delivered to the right place at the right time. Here, we look at three key criteria to help you identify a suitable managed switch for modern automation.

### Key Question

Digital transformation relies on reliable networks to maintain system uptime and reduce risks and errors. Are your current managed switches powerful enough to take the heat?





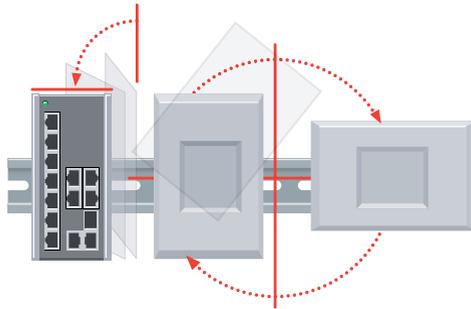
## Key Criteria 1

### Easy to Use, Easy to Operate

Good usability is essential for any networking solution. What makes this more important than ever for industrial automation is the large number of network nodes that appear on a single industrial network. From installation to daily operation and maintenance, the following managed switch functions can help keep things manageable.

#### Various Mounting Options Simplify Installation

Each node may have different requirements depending on where it is installed. Having various mounting options can make installation easy.



#### A Glimpse at the Network Status

Tracking the status of network nodes is just one of the hundreds of tasks engineers need to juggle. Choosing managed switches that have user-friendly interfaces allows you to quickly check the status and make changes easily.



#### Easy-to-maintain, Hot-swappable Design

Device maintenance is unavoidable. Choosing a modular managed switch allows you to hot swap a power or line module during routine maintenance without affecting overall operations.



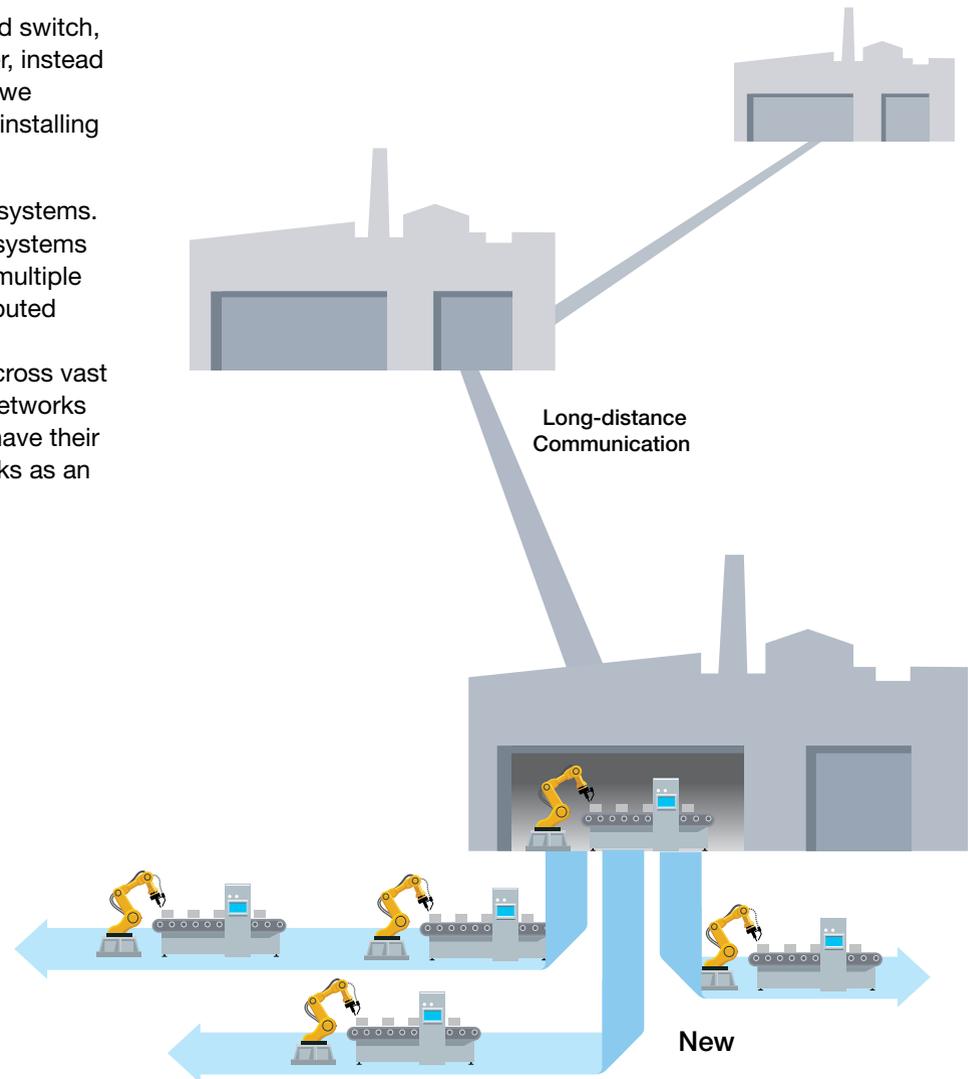


## Key Criteria 2

## Ready to Scale

As with unmanaged switches, when choosing a managed switch, you need to consider future network expansion. However, instead of looking for a compact and high-port density solution, we recommend choosing a modular design to save time on installing additional systems when the need arises.

Another consideration is the location of your connected systems. This might not be an issue when you enable connected systems within a single factory. But what if your project includes multiple factories or facilities in different places? For highly distributed networks, managed switches that support **optical fiber transmissions** can ensure reliable data transmissions across vast distances. Indeed, environmental limitations can make networks difficult to connect. Although wired cabling options still have their benefits, you may also need to consider wireless networks as an alternative in hard-to-wire applications.



## Key Criteria 3

### It's All About Availability and Security

Connecting industrial systems with each other substantially increases network complexity and can affect your day-to-day operations. Any single point of failure can cause network downtime, and critical data can be lost or tampered with. To avoid network node failures, your managed switches need redundant mechanisms and security functions.

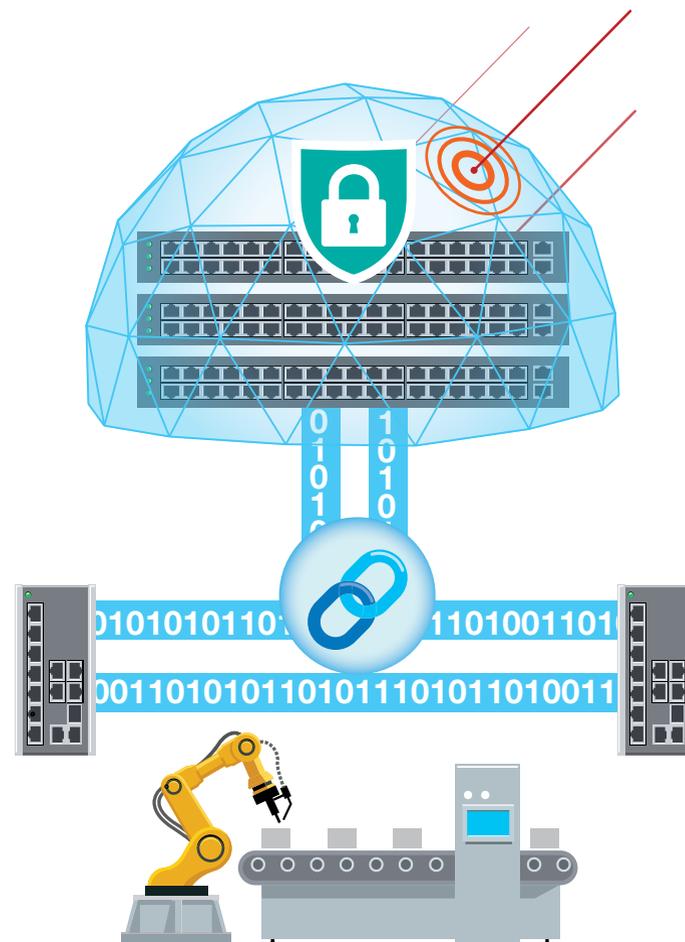
#### Redundant Mechanisms

Turbo Ring/Turbo Chain is an advanced function we have seen on managed switches. The idea is to prevent the loss of critical data if a network node fails. A redundant backup path can be enabled to bypass the failed node and recover the data transmission within seconds or even faster.

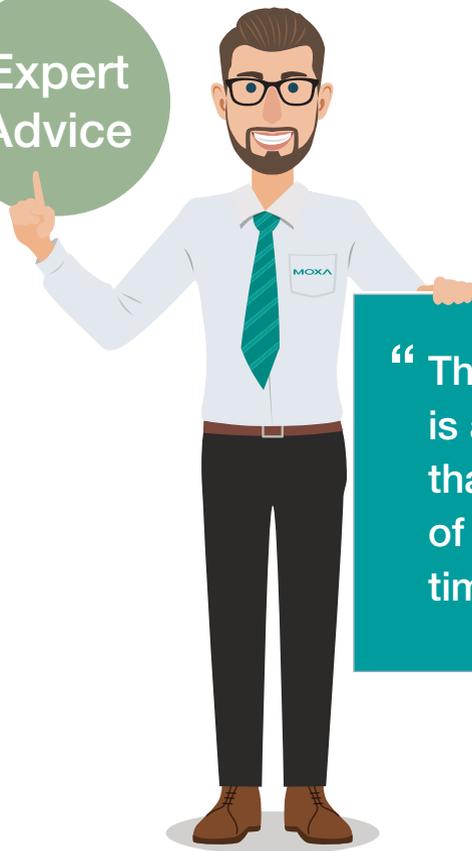
#### Security Functions

Another potential risk for increasing the number of network nodes and connectivity is greater exposure to unauthorized access and vulnerabilities. Security concerns should not be overlooked, so we suggest choosing networking devices with security features based on the [IEC 62443](#) standard to protect your network node from unwanted access. For additional peace of mind, you may even want to choose a vendor that has its own [cybersecurity response team](#) to ensure networking devices are protected from any vulnerabilities.

Moxa has developed a new series of industrial managed Ethernet switches—the [EDS-4000/G4000 Series](#)—with IEC 62443-4-2 certification and rotatable power module design that provide optimal security, usability, reliability, and network performance for any industrial applicants.



Expert  
Advice



“ The key to developing reliable networks is a powerful managed Ethernet switch that is scalable, easy to use, and capable of keeping your data transmissions on time and secure. ”