What are the classifications of ring network industrial switches

Overview

How Industrial Switches Build Industrial Ring Networks This article aims to provide a concise yet comprehensive overview of how industrial switches contrib.

Key Takeaways

Ring network industrial switches are categorized based on redundancy protocols, network layers, and deployment roles in industrial Ethernet networks. 1. Based on Redundancy ProtocolsIndustrial switches in ring networks are often classified by the redundancy protocols they support, which determine how the network handles link failures: Ethernet Ring Protection (ERP): Provides fast recovery in ring topologies, ensuring minimal downtime by rerouting traffic around failed links.

Rapid Spanning Tree Protocol (RSTP): An IEEE standard that quickly recalculates paths to maintain network connectivity. Multiple Spanning Tree Protocol (MSTP): Extends RSTP for multiple VLANs, offering flexible and faster convergence in complex industrial networks. Vendor-specific protocols: Some manufacturers implement proprietary protocols like Moxa's Turbo Ring or Hirschmann's HRP for enhanced recovery times and interoperability.

2. Based on Network LayerIndustrial switches can also be categorized by the OSI layer they operate on: Layer 2 (Access) Switches: Connect end devices and provide basic switching functions within the ring. They often support redundancy protocols like RSTP or ERP.

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Layer 3 (Distribution/Core) Switches: Aggregate multiple access switches, provide routing capabilities, and manage larger network segments. These switches are typically used in backbone or hierarchical ring networks. 3.

Based on Deployment RolesSwitches are further categorized by their deployment role in the ring network: Core/Backbone Switches: Form the main ring loop, handling high traffic volumes and ensuring network resilience. Distribution Switches: Connect multiple access switches to the core ring, often providing Layer 3 services and redundancy management. Access Switches: Interface directly with industrial devices, sensors, and controllers, often designed for harsh environments with features like IP67 ratings, redundant power, and PoE support.

4. Based on Form Factor and Environmental ResilienceIndustrial switches are also categorized by physical design and environmental tolerance: Compact/Space-Constrained Switches: Suitable for machine-level integration or tight enclosures, often IP67-rated. Modular Switches: Allow expansion with additional ports or modules to accommodate network growth.

Ruggedized Switches: Built to withstand extreme temperatures, dust, vibration, and other industrial conditions.

Summary

Ring network industrial switches are categorized primarily by redundancy protocol support (ERP, RSTP, MSTP, proprietary), network layer (Layer 2 vs Layer 3), deployment role (core, distribution, access), and physical/environmental characteristics (compact, modular, ruggedized). Understanding these categories helps in designing resilient, scalable, and high-performance industrial Ethernet ring networks suitable for IIoT and automation applications.

Article Content

How Industrial Switches Build Industrial Ring Networks

This article aims to provide a concise yet comprehensive overview of how industrial switches contribute to the formation of industrial ring networks, catering to both traditional industry

Key Industrial Redundant Ring Protocols You Need to Know

In industrial Ethernet infrastructures, there are various types of ring redundancy protocols. This article focuses on the most common and standardized ones: Each protocol offers

Redundancy Protocol Configuration Guide, Cisco Catalyst IE3x00,

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Device Level Ring (DLR) is a Layer 2 protocol that enables redundancy in a ring topology, providing fast network fault detection and reconfiguration for industrial networks.

Industrial Automation Ring Network Solution

This solution builds a basic two-layer ring network architecture designed to decrease complexity, enhance security, and increase efficiency and operating uptime for your industrial network.

Ring network

There are three main classes of media access protocol for ring networks: slotted, token and register insertion. The slotted ring treats the latency of the ring network as a large shift register that

Ethernet Ring Redundancy

This document provides basic background information regarding adding ring redundancy in your wired Ethernet networks. It will explore the N-Tron proprietary protocol N-Ring and how it is a

Switches and Ring Topologies – PI North America

PROFINET offers a solution by managing a ring topology with two defined media redundancy classes: Media Redundancy Protocol (MRP) and Media Redundancy for Planned Duplication (MRPD) or

Fiber Optic Ring Network Design Explained: Topologies, Diagrams ...

Learn how to design a fiber optic ring network with practical diagrams, topologies, and switch setup tips. Explore ring network switch options for industrial applications.

Industrial Lan switch how to group ring network

Common ring network topology structures include single ring, multiple rings, etc. The single-ring structure is relatively simple and suitable for small networks; The multi-ring structure is

Redundant Ring Technology for Industrial Ethernet Applications

In this white paper, we first discuss traditional redundant technology, including their network topologies and limitations. Next, we introduce “redundant ring” technology, and point out the advantages that

Industrial Lan switch how to group ring network

September 19, 2024 Industrial Lan switch how to group ring network In the industrial Internet of Things, the Industrial Lan Switch group ring network is an important network architecture method that can

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Proprietary Ring Topologies in Automation Networks

In fact, select manufacturers claim much better recovery times for their proprietary ring networks sometimes to within 10 msec. Conclusion on

X-Ring Plus Ethernet Industrial Ring Technology

X-Ring Plus resilient ring technology is provided with network operating system 2.0 & is an enhanced version of Case Communications ''X-Ring'' technology.

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Espacenet – patent search

Espacenet provides free access to over 120 million patent documents worldwide, enabling users to search, download, compare, and translate patents.

What Is Network Redundancy? Key Strategies for Industrial Switches

Learn what network redundancy is and why it matters for industrial communication systems. Explore device, link, ring, and gateway redundancy techniques to build a fail-safe network

X-Ring Ethernet Industrial Ring Technology

Case Communications X-Ring provides an Ethernet Ring between Industrial Ethernet switches, running at 10 Mbps, 100 Mbps or 1 Gbps. X-Ring can support

Industrial Ring Networks | ERPS | Antaira Technologies

Industrial Ethernet switches are critical components in network infrastructures, often used in harsh environments and mission-critical applications. The Ethernet Ring Protection Switching (ERPS)

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