OPSWAT.

The Ultimate Buyer's Guide to Data Diodes

Protecting the World's Critical Infrastructure

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What is a Data Diode?

A data diode is a hardware-enforced cybersecurity device designed to allow data to travel in one direction only, ensuring absolute network segmentation between systems of differing trust levels. Unlike traditional firewalls or software-based gateways, data diodes eliminate the risk of backchannel attacks, misconfiguration, or firmware tampering that could result in bidirectional data flow. They are the ultimate safeguard for environments that cannot afford compromise—like critical infrastructure, government, and high-security enterprise networks.

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Why Do You Need a Data Diode?

Air-gapped networks are only as secure as the weakest transfer point. In today's digitally transformed environments—where ICS and OT networks increasingly intersect with IT and cloud systems—ensuring unidirectional data flow is no longer just a "nice-to-have." It's a mandate for resilience.

Use cases span across many industries, but some notable examples include:

⚡ In energy, diodes enable real-time operational data to flow from substations to monitoring centers—without risking inbound threats

🏥 In pharma, they support compliance by transferring batch records to regulatory systems while isolating sensitive production networks

🏛 In finance, they protect the confidentiality of transactional data while preserving air-gapped backup systems

🏛 In the federal government, data diodes are used to transfer information from classified to unclassified systems (or vice versa) under strict control, supporting secure communications, intelligence workflows, and audit trails in accordance with cross-domain and national security requirements

🏭 In manufacturing, they allow telemetry and performance data to be securely exported from PLCs and SCADA systems to cloud analytics platforms, while maintaining a hard boundary that protects proprietary processes and machinery

Without a diode, your segmentation strategy depends on software. With one, it's physics.

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What to Look for in a Data Diode

Features That Matter in IT Environments

Data diodes for IT use cases must balance security, integration, and throughput. Key features to consider:

- **Broad Protocol Support:** Look for HTTP/S, FTP/S, SMTP, Syslog, TPC and UDP support to accommodate diverse enterprise traffic
- **SIEM and Analytics Integration:** Native compatibility with tools like Splunk ensures visibility isn't sacrificed for security
- **High Availability Architecture:** Downtime isn't an option in mission-critical systems. Choose diodes that support redundant paths and failover
- **Regulatory-Ready Certifications:** Ensure solutions meet standards like EAL4+, Common Criteria, and FIPS 140-2 compliance
- **Scalable Throughput:** Modern IT networks demand gigabit+ performance. Confirm the diode supports the bandwidth your applications require.

Features That Matter in OT Environments

OT environments present unique physical and operational challenges. Key features to prioritize include:

- **Industrial Protocol Compatibility:** Support for DNP3, Modbus, OPC, AVEVA PI, and other ICS-specific protocols is essential
- **Form Factor Versatility:** DIN rail-mounted and 1U rack options allow for flexible deployment—from substations to control rooms
- **Environmental Hardening:** For deployments in harsh conditions, seek models with fan-less designs, wide temperature ranges, and C1D2 certifications or other ruggedization standards
- **Real-Time Monitoring Integration:** Look for seamless data export into operational monitoring tools like AVEVA PI without allowing external access in
- **Power Redundancy:** Ensure consistent operation in the event of primary power loss or voltage instability

Comprehensive Support

Whether it's for OT or IT use, it's critical that your data diode provider is capable of supporting it. Whether it's the guidance needed for initial implementation and configuration, or further down the line if something goes wrong, look for a data diode solution that comes equipped with support you can rely on. Consider a solution that:

- Offers 24x7 assistance
- Options for chat, phone, and ticketing systems
- In-region support channels

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The OPSWAT Advantage: MetaDefender Optical Diode

OPSWAT's MetaDefender Optical Diode is purpose-built to meet the demands of both IT and OT environments. As part of the broader MetaDefender Platform, it brings best-in-class unidirectional data security into a unified infrastructure protection strategy.

With the acquisition of Fend Data Diodes, OPSWAT offers a full range of diode solutions to meet the needs of an array of use cases across industries.

Available in both DIN rail and 1U rack-mounted form factors, OPSWAT's diode supports integrations with Splunk, AVEVA PI, and other industrial data platforms. It carries EAL4+ certification for high assurance, and models designed for Class 1 Division 2 environments ensure reliable deployment in hazardous areas.

Backed by OPSWAT's global threat intelligence and platform interoperability, as well as the expertise of 24x7 technical support, MetaDefender Optical Diode doesn't just secure your data—it makes your entire infrastructure more manageable, observable, and resilient.

05

Your Data Diode Buyer's Checklist

Before you commit to a solution, make sure your diode checks these boxes:

- ✓ **True Hardware-Enforced One-Way Communication**
- ✓ **Support for Both IT and OT Protocols**
- ✓ **High Availability or Redundant Deployment Options**
- ✓ **Integration with Security and Monitoring Tools (Splunk, AVEVA PI, etc.)**
- ✓ **Regulatory Certifications (EAL4+, C1D2, IEC-62443, etc.)**
- ✓ **Form Factor Suited to Your Environment (DIN rail, 1U, etc.)**
- ✓ **Proven Use in Critical Infrastructure Use Cases**
- ✓ **Vendor Reputation and Support Lifecycle**
- ✓ **24x7 Reliable Technical Support**

In cybersecurity, especially critical infrastructure, you don't get a second chance. Data diodes are an investment in prevention—not response. The right solution will not only enforce your segmentation strategy but make your operations more efficient, auditable, and secure.

Give your secure environments a critical advantage—connect with an expert today and discover why MetaDefender Optical Diode is trusted globally to ensure secure networks and data stay that way.

Talk to one of our experts today.

Scan the QR code or visit us at:
opswat.com/get-started
sales@opswat.com

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Protecting the World's Critical Infrastructure

For the last 20 years OPSWAT, a global leader in IT, OT, and ICS critical infrastructure cybersecurity, has continuously evolved an end-to-end solutions platform that gives public and private sector organizations and enterprises spanning Financial Services, Defense, Manufacturing, Energy, Aerospace, and Transportation Systems the critical advantage needed to protect their complex networks from cyberthreats.

Built on a "Trust no file. Trust no device.™" philosophy, OPSWAT solves customers' challenges like hardware scanning to secure the transfer of data, files, and

device access with zero-trust solutions and patented technologies across every level of their infrastructure. OPSWAT is trusted globally by more than 1,800 organizations, governments, and institutions across critical infrastructure to help secure their devices, files, and networks from known and unknown threats, zero-day attacks, and malware, while ensuring compliance with industry and government-driven policies and regulations.

Discover how OPSWAT is protecting the world's critical infrastructure and securing our way of life; visit www.opswat.com.

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