



The Sphyrna Security Unidirectional Gateway (Data Diode) is a high-speed optically assured security appliance that enables organizations to unidirectionally transfer data between disparate networks.

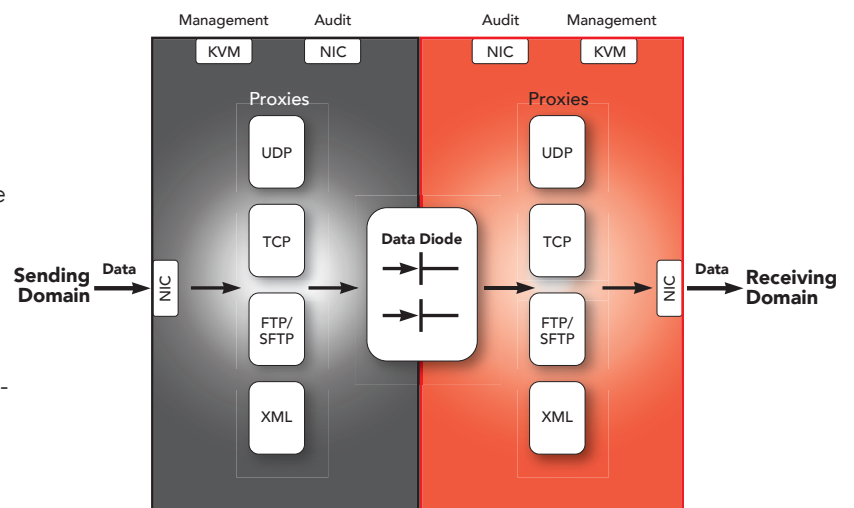
## OVERVIEW

Many organizations have networks operating at different security levels (e.g., Unclassified, Secret, Top Secret) or networks that are particularly susceptible to outside threats (e.g., industrial control systems).

Data diodes, which are one-way information transfer devices, provide a secure means to interconnect these disparate networks. These hardware devices control information flow in one direction while preventing information flow in the reverse direction.

A unidirectional gateway is a 1U rack-mounted appliance consisting of two onboard systems interconnected by a data diode. The system initiating the transfer is the black system on the left side.

The system on the receiving end is the red system on the right side. Dual data diodes provide a one-way transfer mechanism from the black system to the red system. Unidirectionality is assured through the use of transceivers for signal conversion and optical isolators.



*Sphyrna Security Unidirectional Gateway (Data Diode)  
logical architecture*

## PROTOCOL SUPPORT

The data diode serves to provide a protocol break, ensuring that no protocol can be transferred directly from one network to another. This effectively mitigates attack vectors that leverage traffic control data. This is accomplished through the use of unidirectional protocols.

Standard network protocols, including all Transmission Control Protocol/Internet Protocol (TCP/IP)-based protocols, cannot be used as they assume a bi-directional communications channel that supports acknowledgements (ACK). Proxy software (also sometimes referred to as protocol adapters) running on the black side of the unidirectional gateway converts standard network protocols into unidirectional protocols, including incorporating a verification process to mitigate any data lost or corrupted during transfer.

The Sphyrna Security Unidirectional Gateway (Data Diode) supports both unidirectional TCP and User Datagram Protocol (UDP) streaming, as well as unidirectional transfer of data via (Secure) File Transfer Protocol (FTP/SFTP). Extensible Markup Language (XML) validation and filtering is supported using a specialized instantiation of the FTP/SFTP proxy. Custom proxies are also easily developed to support an organization's specific information flow requirements.



*Sphyrna Security Unidirectional Gateway (Data Diode)  
front view*



*Sphyrna Security Unidirectional Gateway (Data Diode)  
3/4 rear view*

## SECURE BY DESIGN

Defence in depth and diversity of defence are security best practices intended to mitigate potential damage when an individual safeguard is compromised. Defence in depth espouses the use of successive layers of safeguards, while diversity in defence encourages the use of different safeguard implementations in order to prevent cascading failures.

The Sphyrna Security Unidirectional Gateway (Data Diode) fully implements both best practices through the provision of the following safeguards:

- Assured Unidirectional Transfer - guarantees unidirectional transfer using both signal conversion and optical isolators
- Hardened Operating System - runs a minimal version of Red Hat Enterprise Linux (RHEL) with the Defense Information Systems Agency (DISA) Security Technical Implementation Guide (STIG) enabled
- Intrusion Switches - attempts to open the device are detected and power to the dual power supplies is cut off
- Keyed Lock - restricts physical access to the appliance
- Mandatory Access Control (MAC) - implements a linear assured pipeline using the Security Enhanced Linux (SELinux) National Security Agency (NSA) Reference Policy
- Secure Boot - validates the operating system being loaded to ensure that no malware has tampered with the boot process
- Software Diversity - leverages multiple compilers and XML validation engines in order to prevent a single vulnerability from compromising the device
- Supply Chain Protection - complicates supply chain attacks by using hardware components from multiple vendors

## ENTERPRISE READY

Dual 10 Gigabits per second (Gbps) data diodes allow the Sphyrna Security Unidirectional Gateway to reliably perform high speed data transfer. In addition to redundant data diodes each system comes equipped with dual RAIDed hard drives in order to provide continued operation in the event of hard drive failure. Role-based administration is provided in multiple languages through a custom administrative interface. The administrative interface can be accessed using an Internet Protocol (IP) Keyboard Video Mouse (KVM).

Organizations with a requirement for secure data transfer are encouraged to contact our sales team for unit and volume pricing. The Sphyrna Security sales team can be reached at 613-704-3514 or by email at [info@sphyrnasecurity.com](mailto:info@sphyrnasecurity.com).