



LIGHT  
SAND

**LightSand**

[www.lightsand.com](http://www.lightsand.com)

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# Typical customer case : The Traditional Approach

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- Data backup & restore are done **locally**
- **Tapes are exported** using trucks to remote sites
- Data movement between long distance sites is **limited** to standard Ethernet qualified Applications for low bandwidth
- Storage Clusters are **interconnected only over dedicated Ethernet layer 2 Links**
- SAN Files systems are used **only locally**
- Backup centers for synchronous data-replication **often close to each other** (less than 30 miles)
- **48 hour** Average Recovery Point Objective
- **24 hour** Average Recovery Time Objective

# Typical customer case : **LightSand** Valued Added

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- Data backups & restore are done **remotely**
- Tapes are **no longer exported** using trucks to remote sites
- Data movement between sites **uses FICON, FC, FCV, iSCSI, Ethernet Layer-2 with ANY application**
- Storage Clusters are interconnected over **standard IP/SONET/SDH** links
- SAN Files Systems can **be distributed over the WAN**
- Backup centers for synchronous data-replication can be located **at 400 miles** or more
- **1 minut or less** Average Recovery Point Objective
- **1 hour or less** Average Recovery Time Objective

# LightSand benefits all customer Data Management applications

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## LIGHTSAND

- Keep native protocol throughput over any distance
- Mix any protocol over one or multiple WAN links
- Provide HA connectivity with failover between links
- Reduce data transfer costs
- Provide long distance transparency to local applications
- Optimize Bandwidth utilization and management



# LightSand solves customer issues in :

## Wan Connectivity

- Solution for **Ethernet Layer 2** connectivity over IP/SONET/SDH.
- **Unique Combination** of SAN/LAN protocol support and **WAN optimization**
- Solution for **deploying HA architecture** over IP/SONET/SDH
- Immediate **compatibility with Existing DR** services solutions to run over distance

## SAN Connectivity

- Resolve **fabric interoperability** issues between any vendor
- **SAN isolation** with remote device virtualization feature available for any SAN and between any vendors
- **FC/FICON/FCV extension** over 2000+ miles
- **Extends transparently** any Data protection application, SVC, PPRC, XRC, Disk Copy

## Mainframe Connectivity

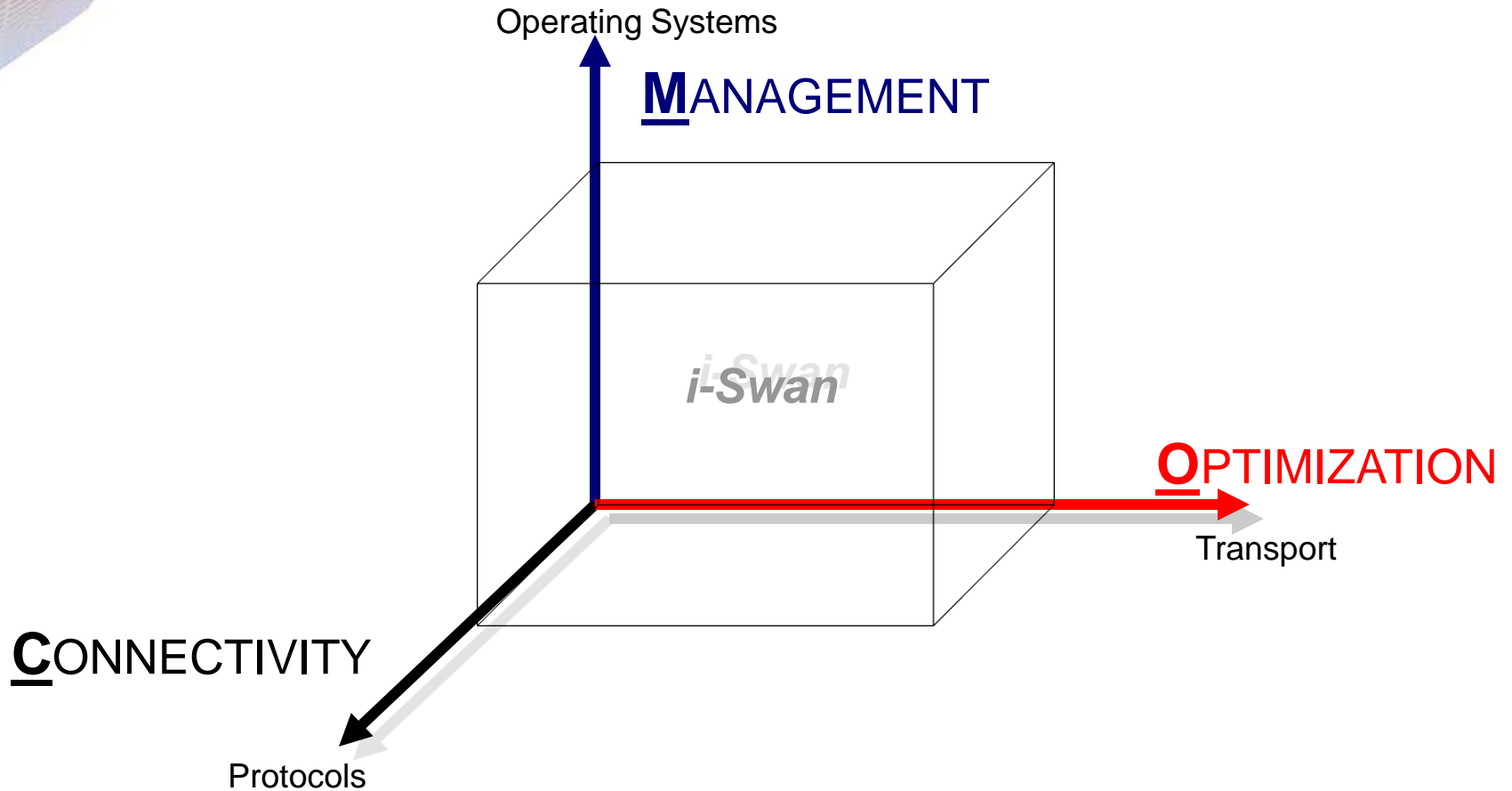
- **Solution for FICON or FCV** connectivity over IP or SONET/SDH
- Replaces cost **prohibitive solutions using Escon over Ethernet** by simple LightSand FCV extension.
- **Enables High availability Solutions** for Mainframes over IP or SONET/SDH between 2 locations
- **Open to New Clustering** protocol support



**LightSand Technology**  
**Open, Innovative , Portable**

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# LightSand Technology : *i-SWAN*<sup>TM</sup> Platform



*i-SWAN*<sup>tm</sup> : Intelligent Storage Wide Area Network

# LightSand *i-SWAN*<sup>TM</sup> : **C**onnectivity – **O**ptimization - **M**anagement

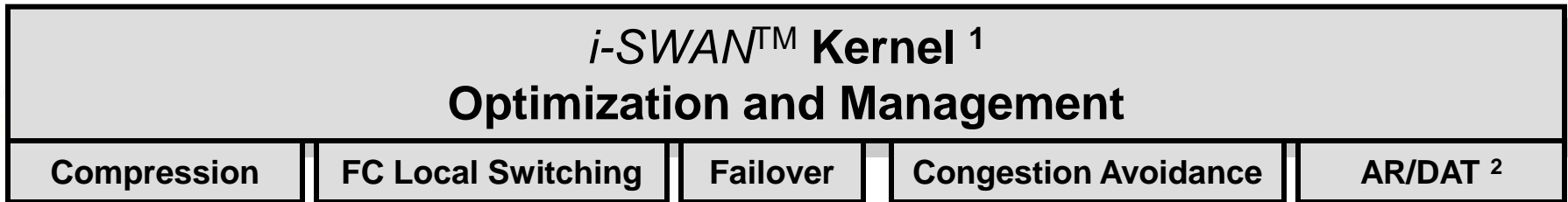
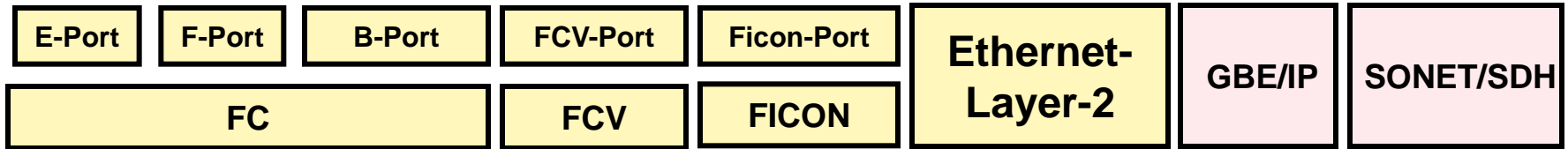
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*i-SWAN* is an independent platform combining unique market capabilities to alleviate sites interconnections issues

- **C**onnectivity : **C**onnects to any standard dataflow from any device and any network component.
- **O**ptimization : **O**ptimizes the data Outflow to reduce transmissions costs and increase transfers speed.
- **M**anagement : **M**anages any Data movement for better reliability, performance and security.



# LightSand *i*-SWAN™ : Multi-Layers architecture



<sup>1</sup> *i*-SWAN Kernel can run on any compatible HW platform

<sup>2</sup> **A**utonomous **R**egion, **D**omain **A**ddress **T**ranslation



# LightSand *i-SWAN*<sup>TM</sup> : Platform Agnostic

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- ***i-SWAN*<sup>TM</sup> platform can interoperate with :**
  - **Any Storage Vendor :**
    - EMC, HP, HDS, IBM, STK, Dell, Brocade, McData, ...
  - **Any Operating System :**
    - (Unix, Mainframe, Fabric OS, other).
  - **Any Application :**
    - Data Movement, Data replication, Remote Backup, Data Encryption, Filesystems,
  - **Any WAN :**
    - *i-SWAN*<sup>TM</sup> platform runs over GBE, SONET/SDH, IP networks.

# LightSand *i*-SWAN™ : Protocol Agnostic

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- **FICON/FCV ports :**
  - Extends Mainframe connectivity and devices with/without requiring Director switches.
- **Ethernet Layer 2 port :**
  - Low layer ethernet high performance extension required for « non » IP based traffic extension : Cluster, iSCSI, netbui, novell, VMS, etc.
- **E-Port with SAN Isolation :**
  - Virtualizes Remote hardware without merging Fabrics.
  - Keeps native mode for local Fabrics.
  - Prevents local fabrics from WAN intrusions and disruptions.
- **B-Port Connectivity :**
  - Transparency in the extension.
  - No need to « downgrade » vendor fabrics to compatibility mode.
- **F-Port Connectivity :**
  - Allows direct host or device attachment without using SAN switches.

# LightSand *i*-SWAN™ : Advanced Management

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- **Local FC switching :**
  - Manage FC traffic from Port to Port in switching architecture.
  - Standalone solution for local SAN based applications.
- **B-Port Trunking**
  - Allows multiplexing of different and independent SAN traffics over the WAN.
- **AR/DAT : Autonomous Regions and Domain Address Translation**
  - Virtualization of remote hardware within local third party fabrics.
  - Local Fabric isolation and protection against intrusions or WAN disruptions.
- **Traffic Multiplexing :**
  - Mixes Storage Traffics (FC or FICON) with Ethernet Traffics.
- **SAN Management Interface :**
  - Advanced Graphic User Interface to manage global interconnected Fabrics

# LightSand *i*-SWAN™ : Optimization and High Performance

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- **High reliable transport protocol**
  - Guaranteed data and order delivery
  - Adjusted to latency sensitive applications
- **High performance :**
  - Up to 40 Gb/s native output. Up to 3 000 km on wire-speed without performance degradation
- **Compression :**
  - Up to 1:21 max compression, 1:3 to 1:5 observed in Production.
- **Congestion Avoidance or Manual Rate Adaptation :**
  - Maintains Maximum performance on shared networks or low bandwidth connections.
  - Allows to fix maximal bandwidth utilization useful when sharing data traffic with VoIP applications on guaranteed SLA.
- **WAN failover :**
  - Automatic and transparent WAN failover management.



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# Products

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# Lightsand Product Families

Products and main Functionalities	FC over IP		FC over Sonet/SDH
	SMB Line	Enterprise Line	Enterprise Line
FC Extension <sup>(1)</sup>	i-8100B SMB	i-8100B	S-8100B
FC Switching Capabilities <sup>(2)</sup>	i-8100E SMB (1) + (2)	i-8100E (1) + (2)	S-8100E (1) + (2)
SAN Isolation/Inter fabric routing <sup>(3)</sup>	i-8100A SMB (1) + (2) + (3)	i-8100A (1) + (2) + (3)	S-8100A (1) + (2) + (3)
FICON Extension	NA	i-8100F	S-8100F

# i-8100X-SMB series

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- **4 ports: FC and Ethernet Layer-2 over IP**
  - 2 x FC ports
  - 1 x GbE/L2 port
  - 1 x WAN link (IP/GbE)
- **Compression LZ-S algorithm (enabled or disabled) 1:24 ratio**
- **Thousands of kilometers without performance degradation**
- **Manual rate Limitation and Congestion avoidance to support « standard » IP SLA.**
- **Supports trunking between FC and Ethernet Layer-2 ports.**



# i-8100X-SMB : Versions

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## ▪ i-8100B-SMB

- 2 x FC + 1 x GbE/L2 over 1 x IP (GbE)
- B-Port connectivity
- (FC + Ethernet-Layer-2) traffics multiplexed over the same IP link
- Support trunking between FC and Ethernet Layer-2 ports
- Manual rate Limitation and Congestion avoidance to support « standard » IP SLA
- Compression LZ-S algorithm (enabled or disabled) 1:24 ratio
- SANman software

## ▪ i-8100E-SMB

- Same features as the i-8100B SMB
- E-Port, F-Port connectivity (Local switching)

## ▪ i-8100A-SMB

- Same features as the i-8100B SMB
- E-Port, F-Port connectivity (Local switching)
- + AR/DAT : SAN-to-SAN isolation (routing between FC fabrics and interconnection of multiple SANs of FC switches from different vendors )

# i-8100x / S-8100x Series

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## IP

i-8100B

i-8100E

i-7100F

i-8100A

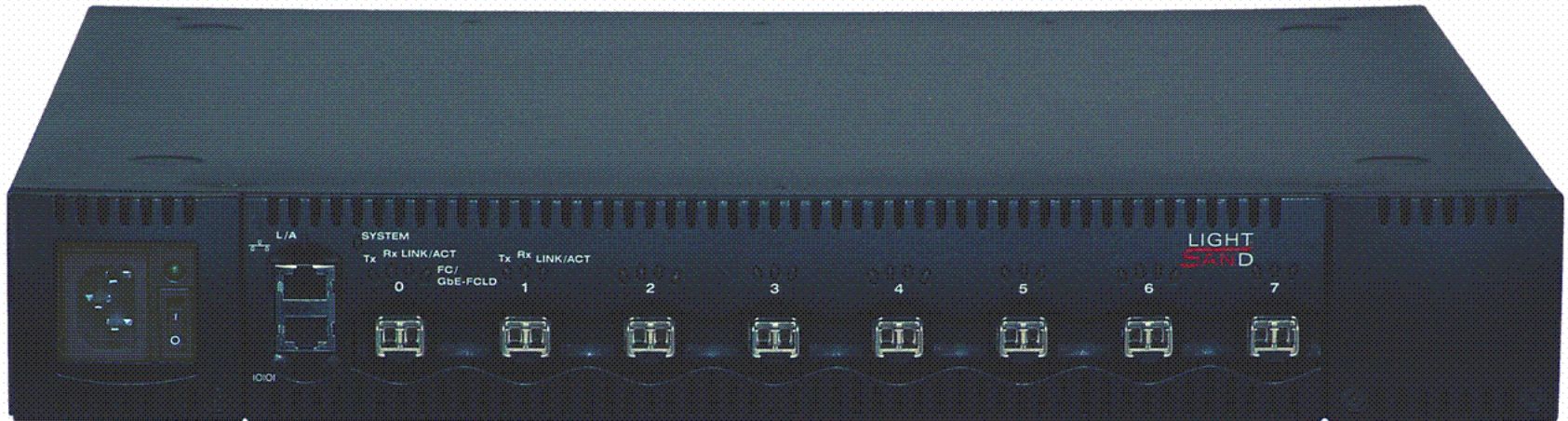
## SONET/SDH

s-8100B

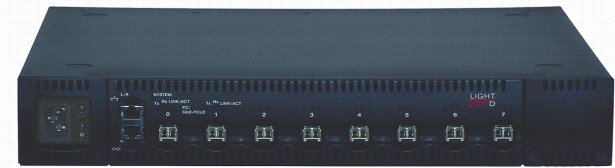
s-8100E

s-8100F

s-8100A

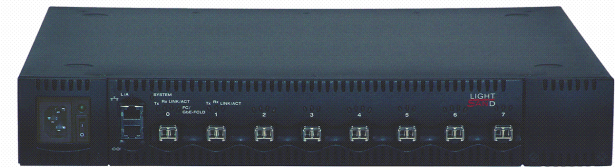


# i-8100B



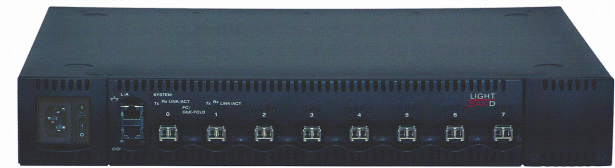
- **8 ports: FC and Layer 2 GbE over IP/GbE**
  - ❖ Up to 7 FC ports
  - ❖ Up to 3 Layer 2 GbE ports
  - ❖ Up to 4 IP GbE WAN ports
- **Extension parallel FC fabrics (with L2 metadata) over the same WAN infrastructure**
  - ❖ An industry standard "B" port interface to the local FC switch
  - ❖ Trunking mechanism for cost effective deployments
- **Extension of up to 3000 kilometers without any performance degradation, and with data and order delivery guaranteed**
  - ❖ Redundant connections for high availability and load balancing
  - ❖ Hardware data compression for more effective utilization of low bandwidth connections
  - ❖ Traffic shaping mechanisms maintaining maximal possible performance in shared or low bandwidth IP WAN environments (Manual Rate Limitation; Congestion Avoidance)

# i-8100E



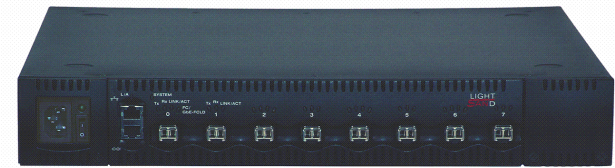
- **8 ports: FC and Layer 2 GbE over IP/GbE**
  - ❖ Up to 7 FC ports
  - ❖ Up to 3 Layer 2 GbE ports
  - ❖ Up to 4 IP GbE WAN ports
- **Flat interconnection of remote SANs (with L2 metadata) over routed IP networks**
- **Local switching, device attachment, support of all mandatory/extended FC services**
  - ❖ Interoperability with all major FC switch vendors
  - ❖ An industry standard “E” port interface to the local FC switch
- **Fibre Channel to Ethernet, IP gateway**
- **Extension of up to 3000 kilometers without any performance degradation, and with data and order delivery guaranteed**
  - ❖ Redundant connections for high availability and load balancing
  - ❖ Hardware data compression for more effective utilization of low bandwidth connections
  - ❖ Traffic shaping mechanisms maintaining maximal possible performance in shared or low bandwidth IP WAN environments (Manual Rate Limitation; Congestion Avoidance)

# i-8100A



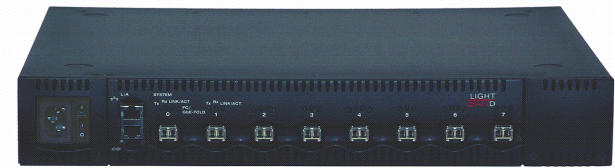
- **8 ports: FC and Layer 2 GbE over IP/GbE**
  - ❖ Up to 7 FC ports
  - ❖ Up to 3 Layer 2 GbE ports
  - ❖ Up to 4 IP GbE WAN ports
- **Interconnection of remote SANs (with L2 metadata) over routed IP networks**
- **Embedded AR/DAT engine to sharing devices without merge of remote SANs**
- **Local switching, device attachment, support of all mandatory/extended FC services**
  - ❖ Interoperability with all major FC switch vendors
- **Extension of up to 3000 kilometers without any performance degradation, and with data and order delivery guaranteed**
  - ❖ Redundant connections for high availability and load balancing
  - ❖ Hardware data compression for more effective utilization of low bandwidth connections
  - ❖ Traffic shaping mechanisms maintaining maximal possible performance in shared or low bandwidth IP WAN environments (Manual Rate Limitation; Congestion Avoidance)

# i-8100F



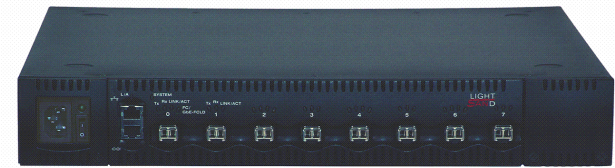
- **8 ports: FICON and Layer 2 GbE over IP/GbE**
  - ❖ Up to 7 FICON ports
  - ❖ Up to 3 Layer 2 GbE ports
  - ❖ Up to 4 IP GbE WAN ports
- **Extension of FICON (with L2 metadata) in point-to-point, switched and cascaded topologies over routed IP network**
  - ❖ Direct attachment of FICON devices
- **Trunking mechanism for cost effective deployments**
- **Extension of up to 3000 kilometers without any performance degradation, and with data and order delivery guaranteed**
  - ❖ Redundant connections for high availability and load balancing
  - ❖ Hardware data compression for more effective utilization of low bandwidth connections
  - ❖ Traffic shaping mechanisms maintaining maximal possible performance in shared or low bandwidth IP WAN environments (Manual Rate Limitation; Congestion Avoidance)

# S-8100B



- **8 ports: FC and Layer 2 GbE over SONET/SDH**
  - ❖ Up to 7 FC ports
  - ❖ Up to 3 Layer 2 GbE ports
  - ❖ Up to 4 OC-3/STM1, OC-12/STM4 (configurable) WAN ports
- **Extension parallel FC fabrics (with L2 metadata) over the same WAN infrastructure**
  - ❖ An industry standard "B" port interface to the local FC switch
  - ❖ Trunking mechanism for cost effective deployments
- **Extension of up to 10000 (OC-12) or 40000 (OC-3) kilometers without any performance degradation, and with data delivery guaranteed**
  - ❖ Redundant connections for high availability and load balancing
  - ❖ Hardware data compression for more effective bandwidth utilization

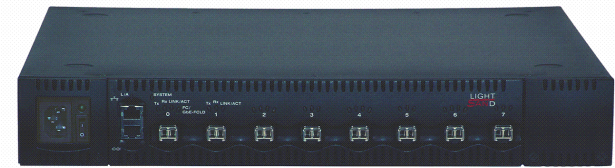
# S-8100E



- **8 ports: FC and Layer 2 GbE over SONET/SDH**
  - ❖ Up to 7 FC ports
  - ❖ Up to 3 Layer 2 GbE ports
  - ❖ Up to 4 OC-3/STM1, OC-12/STM4 (configurable) WAN ports
- **Flat interconnection of remote SANs (with L2 metadata) over SONET/SDH networks**
- **Local switching, device attachment, support of all mandatory/extended FC services**
  - ❖ Interoperability with all major FC switch vendors
  - ❖ An industry standard “E” port interface to the local FC switch
- **Extension of up to 10000 (OC-12) or 40000 (OC-3) kilometers without any performance degradation, and with data delivery guaranteed**
  - ❖ Redundant connections for high availability and load balancing
  - ❖ Hardware data compression for more effective bandwidth utilization



# S-8100A



- **8 ports: FC and Layer 2 GbE over SONET/SDH**
  - ❖ Up to 7 FC ports
  - ❖ Up to 3 Layer 2 GbE ports
  - ❖ Up to 4 OC-3/STM1, OC-12/STM4 (configurable) WAN ports
- **Interconnection of remote SANs (with L2 metadata) over SONET/SDH networks**
- **Embedded AR/DAT engine to sharing devices without merge of remote SANs**
- **Local switching, device attachment, support of all mandatory/extended FC services**
  - ❖ Interoperability with all major FC switch vendors
- **Extension of up to 10000 (OC-12) or 40000 (OC-3) kilometers without any performance degradation, and with data delivery guaranteed**
  - ❖ Redundant connections for high availability and load balancing
  - ❖ Hardware data compression for more effective bandwidth utilization

# S-8100F



- **8 ports: FICON and Layer 2 GbE over SONET/SDH**
  - ❖ Up to 7 FICON ports
  - ❖ Up to 3 Layer 2 GbE ports
  - ❖ Up to 4 OC-3/STM1, OC-12/STM4 (configurable) WAN ports
- **Extension of FICON (with L2 metadata) in point-to-point, switched and cascaded topologies over SONET/SDH network**
  - ❖ Direct attachment of FICON devices
- **Trunking mechanism for cost effective deployments**
- **Extension of up to 10000 (OC-12) or 40000 (OC-3) kilometers without any performance degradation, and with data delivery guaranteed**
  - ❖ Redundant connections for high availability and load balancing
  - ❖ Hardware data compression for more effective bandwidth utilization



# LightSand

**Key points to remember**

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# LightSand : Making SAN extension Simple and Transparent

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- 1. Easy to install and manage**
- 2. Connect to any WAN : IP, SDH, WDM and dark fiber**
- 3. Connect to any SAN : No SAN configuration change**
- 4. Transparent support of all installed SAN applications : Backup, replication, cluster, virtualization...**
- 5. Get more bandwidth, performance and reliability on existing WAN connections**

# LightSand : How do we do it?

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1. **LightSand** combines FC and Ethernet Layer-2 traffic over the same WAN link
2. **LightSand** can extend FICON and Ethernet Layer-2 over the WAN
3. **LightSand** allows the simple remote connection of ESCON devices (FCV support)
4. **LightSand** boosts WAN bandwidth performance 3 to 5 times
5. **LightSand** solves SAN interoperability issues
6. **LightSand** technology offers an optimal cost solution to Small and Medium Business users



Bridging your businesses  
Interconnecting your SANs

**LIGHT  
SAND**  
SAN Connectivity

# Thank you

**Contact :**

**Visit us at :  
[www.lightsand.com](http://www.lightsand.com)**

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