



## LightSand Strengths compared to Other Vendor's solution

LightSand offers variety of products to extend FC, FICON and GbE Layer 2 traffic over distance. The extension media includes IP, SONET/SDH, DWDM and Dark Fiber. Utilizing a simple, transparent method for implementing its SAN extension gateways, based on a commonly used standard, LightSand makes the most of it, compared to Other Vendor's solution.

Internet FC Protocol (iFCP) has not gained too much popularity, although exists as a draft for quite some time. In fact, Other Vendors chose to implement it, mainly for its complexity and the advantages compared to other alternative solutions.

The next items show the advantages of LightSand's implementation while comparing it to the iFCP limitations:

- **LightSand's contains no FC-4 services limitation** – LightSand's implementation, keeps the IP connection transparent allowing all FC-4 services to work seamlessly, including services such as in-band management, FICON and others. Moreover, new services entered in the SCSI level are moved transparently and do not require any additional change or update in the gateways. iFCP replace the FC-2 layer with a new stack and therefore limits the FC-4 services to specific ones. In addition, upon every change in the upper layers (SCSI), iFCP-based gateways require updates and modification – increasing computability and other testing procedures.
- **LightSand's eliminates unnecessary single points of failure** – by using standard FC services which already exist in the fabric, LightSand avoids any unnecessary potential failures. Unlike iFCP, which requires an additional device (iSNS server) to operate – LightSand solution does not require any additional services or servers and does not influenced by any failure of an iSNS server.
- **LightSand's support multiple physical layer transport** – LightSand's gateways support extension of FC over almost any physical media (IP, SONET, SDH, DWDM, dark fiber) with no differentiation – all services and features, including AR/DAT, B-Port trunking and FICON are fully supported with no regards of the physical media used. Unlike iFCP, which is based on IP and Ethernet, no limitations to the physical layer are mandatory, enabling simple future support in any other physical media.
- **LightSand's gateways support tunneling of Layer 2 Ethernet** – a support in Layer 2 Ethernet in addition to FC and FICON over the WAN, brings multi service connectivity to meet various applications and configuration. Layer 2 Ethernet is supported in all the configurations of the gateways, over various types of WAN connections.



- **LightSand's maintain load-balancing** – All LightSand's gateways provide full load balancing capabilities which also aggregate FSPF routing to maximize performance over any given WAN connections. AR/DAT engine maintain this capabilities of load balancing even upon an interconnection between the segmented SANs.
- **LightSand's solution does not force segmentation** – A full isolation of the SAN regions is possible, utilizing the benefits of separated regions (such as scalability, decrease of interrupts between regions, increased manageability and more) through AR/DAT engine. Nevertheless, in contrast to iFCP, this segmentation is not mandatory and therefore enables LightSand to offer a variety of additional capabilities and products. For example, LightSand's gateways support B-Port trunking, allowing straight-forward solution of extending the SAN over distance, enjoying the benefits of standardization and simplicity.
- **LightSand's Gateways are easy to configure and use** – LightSand gateways designed to ease configuration and use. LightSand's gateways are compatible with all major management tools as well as SNMP managers. Unlike iFCP there is no need in configuring any additional services such as the iSNS server, which requires special configuration tools and extra new knowledge of the iSNS and iFCP protocols. Moreover, LightSand's products include SANman management application – allowing full configuration and monitoring over LightSand's gateways as well as other major FC switch vendors.



Feature	LIGHTSAND	Other Vendors
<b>Data/FC Related</b>		
Transparent to end Fibre Channel devices with no FC-4 types limitations	Yes	No
Support for emerging Fibre Channel standards	Yes	No
Uses Fibre Channel fabric routing	Yes	No
Supports mainframe environments	Yes	No
Support B-Port	Yes	No
<b>WAN related</b>		
Requires any additional services besides Fibre Channel native services	No	Yes, iSNS service
Independence of WAN protocol	Yes	No
Sonet/SDH support	Yes	No
Eliminates propagation of local SAN disruptions	Yes	Yes
Rate limitations and dynamic bandwidth control	Yes	Yes
<b>Segmentation</b>		
Scalability limitations due to resources (TCP buffering or CPU requirement) needed for each device to device connection	No	Yes
Optional segmentation utilizing advantages for both methods (with or without segmentation)	Yes	No
239 domains limitations	No	No
<b>General</b>		
In-band management	Yes	No
Out-of-band management	Optional	Required
Industry support for IP extension technology	Wide support	Other Vendors