

**Demanding Application Requirements:**

- Business applications
- Voice
- Video

**Data center operators, which maintain complex computing and storage environments**

**Over 60% of the storage used with Virtual Machines use Fibre Channel based SANs.**

**The average Virtual Machine server image is 10 Gigabytes. Data center bandwidth is doubling every 18 months.**

## The Next Wave of Virtualization

The next wave of data center optimization now involves long distance virtualization between data centers. The same drivers still exist to maximize infrastructure investments and improve asset utilization across data centers, enabled by the dynamic movement of virtual machines, applications, and storage between data centers. In addition, data replication for disaster recovery between data centers will become more paramount as more and more applications are now hosted.

## Virtualization Extension Challenges

As application hosting and cloud computing continues to grow, combined with disaster recovery and rigorous application availability requirements, virtualization strategies must now extend between multiple data centers. As a result, wide area networks must offer LAN-like performance is needed to interconnect users, applications and services.

Virtualization between data centers requires the seamless movement of virtual machines and Storage Area Networks (SANs) This reality drives many interconnectivity challenges as protocols and applications originally designed to operate within the controlled four walls of a single data center must now be seamlessly extended over long distances. Many times, these protocols are not architected to adapt to the latency and data loss which is a reality in all wide area networks. Wide Area Network performance is one of the single most critical aspects in enabling virtualization extension.

For instance, SAN protocols like Fibre Channel and Fibre Channel over Ethernet (FC or FCoE) are not easily extended over wide area networks. Fibre Channel uses a proactive flow control system base on Buffer to Buffer Credits (BBC). There is a direct relationship between latency/distance and throughput. FC performance degrades as distance increases and synchronous data movement is more impacted that asynchronous. Typical FC switches support 64 to 128 BBCs which enables only 128Km to 256 Km reach. More negotiated BBCs enable further reach, but still limits distance and increasing FC switch BBC increases switch costs. Specialized networking solutions are required to extend native storage over distance, which is a key dependency for long distance inter data center virtualization.

One of the most common virtualization tools used by data center operators is VMotion™. VMotion™ is a solution provided by VWARE™, and enables virtualization of servers, storage and networking to move an entire running virtual machine from one server to another. Ensuring the seamless performance of VMotion™ over a wide area network presents many challenges such as:

- VMotion™ requires perfect state synchronization and so requires a high performance, error free virtual link.
- VMotion™ requires Layer 2 interconnectivity between hosts, (to allow gratuitous ARP messages to be exchanged so that the forwarding and routing tables of data center networks, can be updated), yet most of the wide area networks connecting data centers are IP.
- Virtual Machine images are very large and time consuming to migrate and inter data center connectivity can be costly.



Acceleration FOR Ethernet™

# Virtualization Extension ASE3300 Solution Brief

## ASE3300 Key Technology Enablers:

VirtualWIRE – enables transparent extension of any protocol, subnet, and application over any WAN.

SAN-XTEND – native support for FC/FICON/FCOE with extension to 1000's of Kms.

EtherPACK - Hardware-based data compression achieves **5:1** or greater compression on VM images.

CryptoWIRE- AES256-bit WAN Encryption secures all traffic.

EtherCORRECT – achieve live migrations via bit level (payload) and packet level error correction to enable lossless extension of any data over lossless networks.

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## AFORE ASE3300 Seamlessly Enables Virtualization Extension

The AFORE Advanced Service Edge 3300 (ASE3300) allows Data Center managers to move one application from a host in one DC to another without downtime. The ASE3300 normalizes native SAN and LAN protocols to Ethernet, compress, encrypt and tunnel over WAN including IP based networks. The ASE3300 enables the seamless extensions for VM migration by creating secure, AES-256 based encrypted transparent tunnels over any wide area network, including pure IP-based transport networks. The ASE3300 allows for lossless data extension by achieving wide area packet loss immunity, improving the performance of IP networks by compensating for lost or mis-ordered packets and can extend FC/FICON/FCoE and Ethernet simultaneously allowing data synchronization between data centers over any WAN, over any distance.

Enabling live data migrations, while achieving 100% application up-time, is easily implemented using the ASE3300. Vital for enterprises, System Integrators, Managed Service Providers, and any one operating Data Centers the ASE3300 is a key element in designing disaster recovery networks, with the highest levels of application availability and performance. Live application migration allows hosted applications to be moved closer to users when they need them, reducing effects of wide area impairments. Without our product, data center managers/IT managers have to do a lot of costly workarounds:

The ASE3300 reduces complexity for data center operators, eliminating days of planning, costly workarounds, and application downtime. The ASE3300 allows data center operators to avoid maintaining and synchronizing multiple copies of the same application, physically shipping and moving hardware, and impacting user productivity as a result of scheduled application downtime. By seamlessly overlaying existing data center networks ASE3300 enable live migrations of applications, servers, and storage over any distance while , avoiding any re-engineering of data center equipment, such as routers or switches, address plans, firewalls, or load balancers.



## About AFORE Solutions

AFORE provides innovative technology to the networking industry. Our unique blend of InterPort™ Technology, ASE platforms and Custom Development enable network equipment providers and Enterprises to accelerate deployment of advanced networking applications. Visit: [www.aforesolutions.com/ASE/](http://www.aforesolutions.com/ASE/).