THE EMERGING NEED FOR SOFTWARE DEFINED ACCELERATION

A NEW LEVEL OF AGILITY FOR THE VIRTUAL ENTERPRISE
As enterprises deploy Virtual Machines (VM) in geographically diverse data centers for resiliency or load-balancing reasons, IT managers must contend with network performance issues as traffic moves from one location to another. Network latency, congestion, and capacity (i.e. bandwidth), for example, all can adversely impact workload performance across a distributed enterprise. (For the sake of this paper a “workload” is defined as one or more applications running as VMs).

In a traditional IT environment, it has been the network manager’s responsibility to overcome these challenges using tools like Wide Area Network (WAN) optimization. As many companies go virtual, however, virtualization administrators are taking an increasing role in application performance. As the owner of the applications, these individuals shoulder the burden of ensuring those applications work properly across all business locations. As such, new tools are required to enable these individuals to effectively manage workload performance over distance.

This has given rise to a new field of technology – Software Defined Acceleration (SDA). SDA enables workloads to be accelerated over a WAN from within the virtualization domain, using common management platforms like VMware vCenter, Citrix XenCenter, and Microsoft System Center. This makes it easy to accelerate any application in a virtual environment, saving time and money by allowing virtual administrators to provision, manage, and control the acceleration of individual applications from the same panes of glass (i.e. management consoles) they use every day.

SDA allows WAN optimization technology to be consumed by users beyond the traditional networking audience and without disruption of the network. It allows anyone with virtualization experience to quickly and easily accelerate any application over distance using the tools with which they are the most comfortable. Put simply, SDA brings application acceleration to the virtualization enterprise.

UNDERSTANDING SOFTWARE DEFINED NETWORKING (SDN)

The network is often one of the biggest challenges to quickly deploying new workloads. Software Defined Networking (SDN) tackles this problem by enabling IT to decouple workloads from underlying hardware, bringing unprecedented flexibility and control.

To achieve this, IT must isolate virtual machines and their hosts from the underlying network, separating the intelligence in today’s switches and routers from their proprietary hardware. SDN standards, such as the OpenFlow protocol, help on this front by enabling multiple logical networks to share a common physical network. (See Figure 1)
SDN uses a control plane, called a controller, for all switches and routers in the infrastructure. The controller enforces network wide policies, preventing the logical networks from interfering with one another, just as a hypervisor protects VMs from each other. The forwarding engine and data plane continues to operate as before. This results in a number of SDN benefits, which include:

- **Operational Savings**: SDNs lower operating expenses. Network services can be packaged in a way that application owners can perform actions on their own, freeing up the networking team.

- **Flexibility**: SDNs create flexibility in how the network can be used and operated. Organizations can write their own network services using standard development tools.

- **Improved Uptime**: By eliminating manual intervention, SDNs reduce configuration and deployment errors that can impact the network.

- **Better Management**: IT can use a single viewpoint and toolset to manage virtual networking, computing and storage resources.

- **Planning**: Better visibility into network, computing, and storage resources means IT can also plan more effectively.

- **Infrastructure Savings**: Separating route/switching intelligence from packet forwarding reduces hardware prices as routers and switches must compete on price-performance features.

SDN enables IT to create a flexible agile fabric that can be reconfigured as quickly and efficiently as the workloads that run over them.

**UTILIZING SDN PROTOCOLS TO ACCELERATE APPLICATION PERFORMANCE**

As workloads move throughout a distributed enterprise, specific tools are required to ensure that network limitations, such as bandwidth, latency and congestion do not adversely impact application performance. Just as SDN simplifies the actual transport of data across an enterprise, Software Defined Acceleration has emerged as a way of accelerating application performance across a distributed enterprise.

With SDA, virtual administrators can use existing virtualization management tools to select which workloads need acceleration as they move throughout a distributed enterprise. With a simple point and click, traffic is then routed between the virtual switch and an acceleration engine, such as a Silver Peak virtual appliance, using the same protocols as SDN. (See Figure 2)

The acceleration engine applies various real time techniques to condition the data for travel between sites. These optimization techniques might include data deduplication to maximize available network capacity (i.e. bandwidth), latency mitigation to overcome distance limitations due to chatty protocols, Quality of Service (QoS) to prioritize workloads, and loss correction techniques to minimize the ill effects of network congestion (i.e. dropped / out of order packets).
While the specific acceleration techniques employed by an SDA solution will vary by vendor (as might the underlying SDN protocols used), Software Defined Acceleration solutions typically have the following common key characteristics:

- **Workload Level Granularity:** The acceleration engine should have application visibility at the workload level, giving insight into the performance of all applications running throughout an enterprise.

- **Workload Independence:** An SDA engine should be able to accelerate any workload regardless of the application or amount of data being moved over distance.

- **Integrates with common Hypervisor tools:** Workload acceleration should be handled from within existing hypervisor management consoles. (See Figure 3)

**USE CASES FOR SDA**

SDA benefits any distributed organization using a virtual infrastructure, with the following being some common use cases:

**Workload owners and virtualization managers within large enterprises** must work with the networking team to accelerate their traffic over distance. This can involve meetings and bureaucratic delays not to mention time to deploy and test equipment. SDA eliminates much of that delay by letting virtualization managers deploy acceleration in minutes.

**Companies with Managed WAN Services and cloud deployments** often want to accelerate an application but are unable to access the network equipment owned by the service provider. As such, they cannot make whatever modifications may be required to deploy an acceleration engine. SDA enables workload acceleration without touching the service provider’s equipment.

**A NEW LEVEL OF AGILITY**

In an agile business, application owners and virtualization managers need to deliver solutions fast. This requires new functionality within the virtual environment for accelerating workloads across a distributed environment.

Software Defined Acceleration gives virtual administrators the performance, flexibility, and control they need. By enabling these individuals to maximize the performance of individual workloads in a fast, easy and highly-efficient manner, SDA is a key requirement for any virtual enterprise.

To learn more about Silver Peak’s complete portfolio of solutions for accelerating data mobility over distance visit us at www.silver-peak.com

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**Figure 4:** Software Defined Acceleration solutions, such as Silver peak’s Agility, gives enterprises the point/click flexibility to optimize workload mobility across any location, including cloud and MSP environments.