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How Virtual Server Environments Benefit from KVM Solutions

Overview of KVM

There's a misconception permeating the IT industry that the server market is shrinking. The logic is as follows: technological advances have reduced the amount of space needed for servers on racks in server rooms and in data centers. To the extent that less space is needed to support the same amount of data, the contention is true. Several virtual machines – software implementations of a machine (i.e. a computer or a server) that execute programs like physical machines – take up the same space as a single physical server and, naturally, support multiple times the data of the one physical server. The assumed conclusion often drawn is that KVM solutions – hardware devices that allow users to control multiple computers or servers from a single keyboard, video and mouse – fall in demand as fewer servers are needed to meet IT needs. Unfortunately, this assumption is false, drawing from an oversimplified picture of the server market.

The server market is not shrinking; it's changing. On paper, the rationale behind the assumption that less holds more is sound, but that position rests on the data environment remaining the same, which is not true. The multiplication of virtual servers has actually increased the demand for physical servers. Data is not only growing geometrically, the technology supporting it, of which servers form a substantial part, is diversifying. This growing complexity and changing data needs, largely driven by cloud-centric solutions, requires technology that can manage a variety of hardware, such as KVMs, especially when offered with management software. KVM access to the hardware level, in traditional and mixed environments, also provides a failsafe mechanism.

These are the main assertions to be developed in this white paper, but, first, let's evaluate the state of the server market and the IT industry as a whole.

Growth of the server market

A sharp economic dip, precipitated by the housing crisis in 2008, affected not just the real estate and financial sectors, but virtually all industries, including IT. Many IT budgets were cut, and technology providers suffered as a result. But since the recession, worldwide IT spending recovered to grow annually 5.9 percent to $3.4 trillion in 2010, according to a Gartner report from June 2011. The server market proved a particularly healthy sub-sector, recovering to grow annually 13.2 percent to $52.3 billion in 2010.

The report not only reveals a recovery that has taken place, but is also bullish in its forecast, predicting a long-term annual average growth of 5.3 percent compound annual growth rate (CAGR) to 2015. Growth among virtualization frameworks is expected to accelerate even more quickly, as mobile technology and bring your own device (BYOD) to work initiatives drive the need for virtual machines and remote access solutions.

Rise of virtual machines

Before discussing the role of virtual machines in today's IT landscape, it's important to note the rate and manner in which these technologies are being adopted. x86 servers are growing at a reasonably strong rate (4.7 percent CAGR to 2015), but the rate at which x86 workloads will be virtualized is much more pronounced. Half of them will be virtualized this year, and three quarters

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will be virtualized by 2015, according to a Gartner report published in May 2011. The same report projects that virtual machines will quintuple from 2010 to 2015 at a 38 percent CAGR.

As expected, enterprises were early adopters of virtualization technologies and methods, utilizing, in many cases, VMware and Citrix as the frameworks to virtualize. Small and medium-sized businesses have been slower on the uptake. Microsoft has been successful in targeting the SMB market with virtualization offerings, but this market is still in relative infancy.

Another important trend to observe in this space is the manner in which enterprises and SMBs have been virtualizing. Enterprises usually deploy incrementally because of the nature of these deployments, which tend to be large and complex, accommodating different end-point devices and user configurations. SMBs, by contrast, take longer to arrive at the business conclusion to virtualize, but once they arrive at that conclusion, they virtualize in one fell swoop. This is significant because as virtualizing becomes more commonplace within the SMB community, adoption rates should spike since, given behavior thus far, they will likely virtualize at once.

Virtualization does not shrink the server market

Considering the growth and projected adoption of virtualization technology in the next few years, the assumption some make is that a vast hardware consolidation is taking place in the market. As stated in the introduction, there is some logic to this stance, although, as we've shown through the Gartner study, the physical server market is also trending upward. Still, it stands to reason that if you need much less space to support the same amount of data, fewer servers will be needed. But the market is signaling a different trend.

It may seem counterintuitive, but the market is showing that if a server environment is heavily virtualized, demand for more servers actually rises, which is supported by research cited earlier. This demand refers to the business requirements of new applications. Thanks to virtualization technology, IT departments can deploy development and test environments for new applications on virtual machines very quickly. These test environments consume very few computing resources and provide organizations with the flexibility to experiment with many different applications. But once the new application is ready to go live, a production environment, which does require significant computing resources, is required. In order to guarantee optimal performance, physical servers are needed.

KVM and Virtualization, Then and Now

As the computer industry grew in the 1980s so did the need to consolidate the IT sprawl that came in the form of scores of monitors, keyboards and mice. Hardware was taking up too much rack space and emitting excessive heat. Server management also became a challenge in large data centers where technicians had to walk to each physical server.

KVM technology first provided single-user access by allowing users to access multiple CPUs from a monitor, keyboard and mouse, which addressed some of the above issues, improving server manageability, heat disbursement and space utilization – all representing cost-savings. But as enterprises grew in complexity and required more flexibility, multi-user KVM solutions arose, allowing data center managers to set up control rooms where technicans could remotely access any

or all of the servers/devices in their server farms, eliminating the need for physical access to sensitive equipment. Switches could be configured so that users would have varying levels of access, subject to different security features.

Virtualization, first developed in the 1960s, grew out the same need: to achieve better hardware utilization. It was first implemented by IBM as a way to partition mainframe computers into separate virtual machines, allowing the mainframes to run multiple applications and processes simultaneously – a significant cost-saving at a time when mainframes were expensive resources.

As KVM began to rise in the 1980s, virtualization adoption dropped precipitously on account of inexpensive servers enabling distributed computing. But as the server market grew, other operational challenges presented themselves, including, but not limited to, increasing physical infrastructure costs, increasing IT management costs, and inadequate disaster protection, which set the stage for a resurgence of virtualization.

At first, it appeared that the virtualization and KVM technology were mutually exclusive: virtualization reduced the amount of hardware needed, the same hardware that KVM technology was used to manage and control. But mixed environments have shown the utility and coexistence of both technologies. One might have assumed that if virtual servers were multiplying so quickly, the need for KVMs and other hardware was not necessary. Again, at face value, this perspective seems reasonable enough, but upon further examination, it becomes clear that the issue is not so simple.

Firstly, it's important to highlight that mixed environments, that is, server environments that include virtual machines and physical servers, are great in number, possibly the most common server scenario that exists today. The growth of virtual machines is outpacing and is projected to continue to outgrow physical servers. As shown earlier, physical servers are also on the rise, which is further testament to the skyrocketing demand for greater data capacity. One would be remiss to forget, as revealed earlier, that enterprises, which are driving the bulk of virtual server growth activity, tend to deploy virtual machines gradually, instead of ripping and replacing an entire environment. The continuing growth of physical servers coupled with the purchasing patterns of enterprises point to the long-term reality of mixed server environments. In physical and mixed environments, KVM switch technology is instrumental in managing data centers.

Secondly, KVMs serve as a failsafe mechanism for servers, because they provide access to the physical layer of the machine. There is still a need for a physical connection to the server: management of the board, power on/off, maintenance, internal hardware upgrades, etc.

Considering that so many data centers are only partially virtualized, the ability to support physical units and virtual machines as well as manage the interface of physical and virtual technologies is an important consideration. In that respect, KVMs have special utility. Some KVM switches come equipped with management software that allows IT administrators to remotely monitor and control all installed devices, including blade servers and virtual machines. Such software supports all of the most popular virtual server offerings, including VMware: VMware Remote Console (VMRC) plug-in integrate, Citrix: Xen Console integrated, Microsoft Hyper-V, HP Integrity VM, and IBM Power VM.
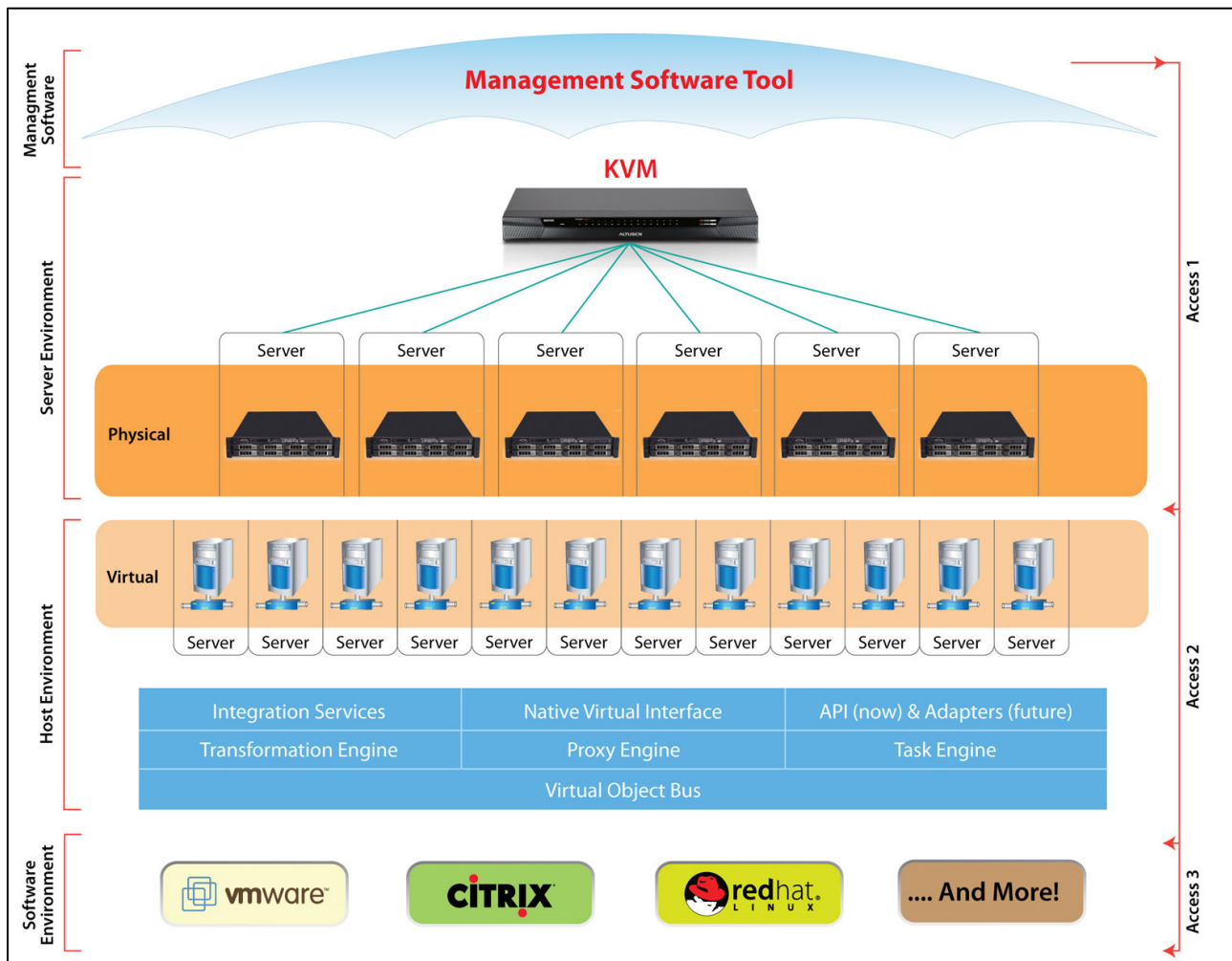
The case of private clouds

Another misconception that should be disproved is that virtualization and cloud computing have rendered hardware features unimportant. That may be true of public clouds, whose reliability, availability and serviceability (RAS) tends to be built into the software layer, but that's not the case with respect to private clouds and virtualization.

Private clouds, by contrast to public clouds, are more reliant on hardware for their RAS capabilities. Private clouds are used as a solution to virtual machine sprawl issues and increase IT responsiveness to business demands. The upshot of this is that IT managers will choose hardware with high RAS to fulfill virtualization and private cloud implementations.

The continued need for KVM switches

The role of KVM switch technology in the increasingly virtualized world of data centers may not be central, but it's important. The goal here has been to debunk certain notions and assumptions

about KVMs and hardware as they relate to virtualization technology. The main assumptions opposed are the following:

1.   The growth of virtual machines has led to the marginalization of hardware technology in the data center. Research evidence to the contrary was presented. It was also demonstrated that when an environment is heavily virtualized, demand for physical servers rise because of the need to support new applications tested in virtual environments. All this adds up to both physical and virtual server market growth.

2.   KVM and hardware add no value to a virtualized environment. KVM addresses the issue of mixed environments, enabling the management of virtual and physical machines, and built-in management software supports cross-platform virtual machines.

Virtualization is being adopted at increasing rates. That cannot be denied. But the implications of this fact are more nuanced and complicated than some may have you believe. The evolution of technology is gradual, and the support of multi-generational technologies is a long-term reality for IT managers. Practical hardware that supports these mixed environments, like KVM with built-in management software, is an enduring necessity.

About ATEN

ATEN is a global manufacturer and innovator of connectivity products spanning KVM (keyboard/video/mouse), data center management and professional A/V solutions. The company's comprehensive product line serves a diverse base of enterprise, government, SME and SOHO customers. Specifically, ATEN offers a full line of KVM switches, remote management products, LCD KVMs and consoles, power management appliances, data connectivity, extenders and audio video hardware.