HYPERCONVERGED INFRASTRUCTURE & THE PATH TO A MODERN DATA CENTER

Nimboxx HCI Achieves the Full Benefits of Modular Scalability, Versatility, Budget Consolidation and More
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INTRODUCTION

The evolution of enterprise IT has finally reached the point where mid-size companies can cost effectively exploit the benefits of fully virtualized cloud operations and large and mid-size companies alike can greatly reduce the costs of expanding already virtualized infrastructures.

The linchpin to this transformation is Hyperconverged Infrastructure (HCI) technology. HCI overcomes barriers such as the need to invest in large blocks of disparate compute and storage facilities that have prevented many mid-size enterprises from reaping the benefits of cloud-based operations which is to say the orchestration of virtualized data center resources across multiple workflows.

By integrating compute, storage and networking assets within a multi-core commodity appliance, state-of-the-art HCI platforms provide a modularized, low-cost approach to scaling the cloud with access to all the types of storage used with traditional approaches, including RAM, flash-based solid state memory and HDD (hard disk drive) storage. As they scale the HCI cloud module by module, IT teams are able to seamlessly orchestrate hardware resources across the integrated cluster to support flexible configurations of ever more workflows and applications.

For mid-size enterprises the ability to capitalize on the benefits of a fully virtualized cloud environment is becoming mission critical. IT operations teams, long overburdened and cost constrained by multiple islands of data center functionality devoted to specific workflows and applications, are now taxed with the need to implement new software systems supporting digital business initiatives, enhanced security, more robust backup and recovery and much else.
Integration and virtualization of data center resources through consolidation of servers, storage components, special purpose appliances and software applications into a shared resource pool is the obvious solution. But the costs of building and operating fully virtualized infrastructures have prevented many companies from moving in this direction.

While the emergence of converged system solutions has made it easier for large enterprises to adopt IT virtualization strategies, these options are still dependent on discrete compute, storage and networking components that have been racked together in specialized chassis that are beyond the budgets of most mid-size enterprises. Not only do these converged systems fail to satisfy the modular scale-out requirements of these companies; they impose high licensing costs for the hypervisors that support virtualized use of these resources across different applications.

As a result, virtualization in mid-size firms has been largely limited to the dedication of commodity compute and storage resources to vertical-specific functions tied to a given workflow such as accounts payable, payroll, customer service, supply chain management, etc. In some cases, such applications have been moved to public cloud resources, but, in general, public cloud adoption has been much less pervasive among mid-size enterprises than it has been with larger companies, primarily because the smaller companies’ workflows and software systems have not been adapted to the virtualization environment.

HCI provides enterprises a way to proceed incrementally into the next level of data center virtualization, building private clouds at the outset and eventually integrating them with public cloud services into hybrid cloud environments. Depending on the choice of HCI solutions, IT departments can begin from a base as small as a single node occupying one RU (rack unit) of space, avoiding big upfront investments in capacity that may not be needed for some time to come, if ever.

With implementation of HCI, IT managers can introduce new software systems on the modular virtualization platform and gradually transition existing workflows into the new cloud environment as legacy software systems
are upgraded or replaced. Ideally the HCI solution should be equipped with APIs supporting integration into pre-HCI OpenStack virtualization platforms, allowing IT teams to expand the benefits of modular scalability as they outgrow existing capacity.

Critically, HCI has moved well beyond the new technology prove-in stage, growing as a sector from a worldwide revenue base estimated at $142 million in 2013 to a projected $807 million in 2015, according to International Data Corp.\textsuperscript{1} Thus, with growing market adoption, HCI has already achieved credibility as a mainstream advancement that infrastructure and operations (I&O) teams can count on to achieve benefits that have long been out of reach for many companies.

Now, as old assumptions about the limitations of virtualized data center operations give way to capitalizing on the HCI paradigm, the challenge for IT teams is to identify all the advantages that can be derived from HCI and to make sure those advantages are captured in the choice of HCI platforms. While, by definition, most vendor HCI solutions deliver a similar subset of basic benefits, there is a great deal of variation when it comes to realizing the full potential of HCI technology.

As explained at length in the discussion that follows, the HCI platform designed by Nimboxx uniquely satisfies all requirements for a highly versatile solution that can be deployed into virtually any IT data center operations environment. This is a key reason for Gartner’s selection of Nimboxx as one of just five “cool vendors” in its 2015 Cool Vendors in Servers and Virtualization report.\textsuperscript{2}

Before exploring the specific capabilities of the Nimboxx HCI solutions, we’ll look at the market trends that underlie mid-size enterprises’ needs for more efficient data center infrastructures and operations. We’ll then take a deeper dive into how HCI in general provides a cost-effective path to meeting these needs, concluding with the Nimboxx overview and points of differentiation from other solutions.

\textsuperscript{1} IDC, \textit{Worldwide Hyperconverged Systems Forecast}, April 2015
\textsuperscript{2} Gartner, \textit{Cool Vendors in Servers and Virtualization}, April 2015
The rapid evolution of IT and data center technology, including the growing role of private and public cloud computing, has raised the bar for IT departments in companies of all sizes as they seek to deliver the software and functionalities that are vital to saving costs and maintaining a competitive edge. Figure 1 illustrates the major steps in that evolution on a pan-industry basis, although for mid-size enterprises the path isn’t necessarily linear owing to the fact that the emergence of HCI as a mainstream option enables a direct leap from Datacenter 1.0 to Datacenter 3.0.

The early years of the 21st century have witnessed a major transformation in data center operations, and for good reason. The proliferation of IT systems over many decades produced a proliferation in dedicated silos of functionality and resources, each with separate management teams, competing budgets and demands for resource agility and responsiveness that couldn’t be achieved under status quo conditions.
In the traditional environment, with each new application a new server, storage system and network switch, all requiring additional cabling, had to be deployed. Over time, even mid-size companies found themselves working with hundreds or thousands of storage systems and servers.

The pile up of manually intensive processes has grown more untenable with the modularization of applications. Rather than waiting for introduction of a new holistic version of a software system every year or two, IT managers find themselves having to introduce upgrades to different modules in any given software system on a regular basis. Moreover, with the onset of big data analytics, IT teams must continually ensure they are bringing those systems into play across multiple workflows, requiring a level of cooperation and coordination that is difficult to sustain in the fragmented traditional operations environment.

Adding to the operational complexities, the need to keep pace with developments in the digital economy has led to the emergence of a whole new realm of IT expertise and responsibilities, sometimes paralleling, sometimes completely separate from traditional areas of responsibility. The traditional data center has proved to be an inhospitable environment for the fast-paced digital business models, where the focus is on agility and speed-to-market amid an incessant flow of application innovation.

THE EMERGENCE OF VIRTUALIZATION

Data center consolidation through virtualization, where primary storage, server and software applications and their backups run as a unified stack on a shared resource pool, opened a way for IT departments to ease the pain of traditional operations. This was greatly facilitated by the success of OpenStack as an open-source data center OS enabling the use of dispersed compute, storage and networking resources to support multiple applications encapsulated in virtual machines (VMs) hosted on proprietary hypervisors like VMware’s vSphere, Microsoft’s Hyper-V, Oracle’s VM Server and many others or on open-source hypervisors like KVM, Linux-VServer, OpenVZ, Xen, etc.

In a 2014 survey of 2,339 CIOs in 77 countries, Gartner found that 51 percent of respondents agreed with the statement: “My business and its IT organization are being engulfed by a torrent of digital opportunities. We cannot respond in a timely fashion, and this threatens the success of the business and the credibility of the IT organization.”

3 Gartner, Taming the Digital Dragon: The 2014 CIO Agenda, October 2014
Server virtualization technology registered as a top-three tier priority for the fourth year in a row.

OpenStack enabled administrators to shift allocation of data center resources to each VM as needed, resulting in a massive reordering of budgetary priorities for companies that could afford the transition. Through ups and downs in IT spending over the past few years, spending on private cloud infrastructures has remained a major factor in IT budget allocations.

According to the 2014 edition of Enterprise Strategy Group’s annual IT spending survey of 562 IT professionals at midmarket (100 to 999 employees) and enterprise-class (1,000 employees or more) organizations in North America and Western Europe, anticipated 2015 outlays for server virtualization technology registered as a top-three tier priority for the fourth year in a row. Buildout of full private clouds is in the top ten priority list, ESG reported.

Public cloud computing is also a top priority, as reflected in research findings from Goldman Sachs (Figure 2). These figures reflect a projected 30 percent CAGR for enterprise spending on public cloud IT infrastructure

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and platform services from 2013 through 2018 compared to five percent CAGR for overall enterprise IT. IDC predicts that by 2016, there will be an 11 percent shift of IT budget away from traditional in-house IT delivery toward various versions of cloud computing as a new delivery model.\textsuperscript{6}

THE ROLE OF DIGITALIZATION

Digitalization has been a major force behind transformation of IT infrastructure and operations. Research has shown that IT departments commonly list digital business models tied to analytics, mobile, online marketing, customer relationship management and collaboration as major priorities that require new approaches to IT operations. In what Gartner refers to as the “bimodal” approach to meeting this challenge, many organizations are utilizing new private and public cloud resources under separate teams or through partnerships and even crowdsourcing inside innovation marketplaces.

In contrast to the traditional “Mode 1” of IT operations, where different IT systems employ specialized teams relying on their own dedicated data center resources, Mode 2 teams combine skill sets to facilitate rapid implementation of multiple applications as they are added to the digitalization agenda. But it’s clear that the incentive to move to the Mode 2 of IT operations applies across the entire IT domain.

This is reflected in the surging use of public cloud services, with some surveys suggesting the public cloud will be an integral part of IT operations at a majority of large companies within a few years. While cost savings are a factor behind the move to the public cloud, by far the biggest motivator is the greater agility, innovation and speed to market the public cloud provides for executing IT requirements in a fast-moving market.

At the same time, IT spending priorities point to areas where it would be wise to invest in private cloud resources through renovation of core operations, including money earmarked for infrastructure and data center facilities, enterprise resource planning, security and applications. In other words, priorities tied to both digitalization and the more traditional aspects of each company’s business logically call for the use of cloud technology in both public

\textsuperscript{6} IDC, 2015-2017 Forecast: Cloud Computing to Skyrocket, Rule IT Delivery, January 2015
and private iterations and in new hybrid models as well, where companies can leverage seamless tie-ins between in-house and hosted environments.

CONVERGED INFRASTRUCTURE

The next logical step in private cloud development has been the emergence of converged infrastructure, where vendors pre-package the data center resources under control of a common management interface. By networking the discrete compute and storage resources together in a single large chassis, converged systems use less space, consume less power and eliminate the hassles of patching together diverse elements with cabling stretching across the data center.

Many large enterprises have taken advantage of converged infrastructure to expedite the transformation of traditional data centers into private clouds. IDC predicts the converged system market, valued at $5.4 billion in 2013 will reach $14.3 billion by 2017, representing a five-year CAGR of 32.8 percent.\(^7\)

A recent development that appears to be accelerating the transition to converged cloud infrastructures is container technology, most prominently spurred by Docker, the open-source software designed to access the virtualization features of the Linux kernel in server operating systems. By tapping the Linux kernel functionality to prescribe specific allocations of CPU, memory and other resources for each application, the Docker-based architecture makes it possible for multiple containers to share the same kernel, thereby eliminating the need for hypervisors and VMs.

The container, essentially implementing an OS within the host OS, behaves like a VM but results in much greater efficiency in utilization of hardware resources, enabling many more instances of applications to run in a given resource allocation than is possible with VMs. Moreover, the lightweight containers are highly portable, enabling integration into multiple resource environments, including public clouds through utilization of tools supplied by Amazon Web Services, Google Cloud Platform, Microsoft Azure and others.

\(^7\) IDC, Worldwide Integrated Systems Forecast, March 2014
Almost a third of the respondents in the ESG survey indicated that managing VM migrations was among their most time-consuming activities.

But even with use of container technology, the benefits of converged systems have been out of the budget reach of many mid-size enterprises. These systems scale in coarse increments and don’t integrate well with existing data centers, which means investments must be made in big blocks of hardware that may not be fully utilized for years, if ever.

Upfront commitments to large, fixed allocations of storage capacity are an especially daunting cost element given the impossibility of predicting just what the memory requirements will be for future applications. Uncertainties are compounded by the fact that enterprises must be able to respond to the need to deliver faster response on IT applications through ever greater reliance on solid-state storage.

Moreover, big investments in converged systems lock users into reliance on CPU and memory technology that will be outdated by technology advances that typically lower equivalent asset costs by half long before the investment is fully depreciated. Hard disk drive storage density, for example, has been increasing at a rate of about 10 percent per year since 2010, with prices dropping at about 13 percent annually.

Jumping to such huge scales of virtualization also imposes hard-to-achieve changes in operational methods across multiple IT teams, which must be able to transition from error-prone manual processes to automated policy-based techniques. Almost a third of the respondents in the ESG survey indicated that managing VM migrations was among their most time-consuming activities.

Adding to the cost burdens of both traditional and converged virtualization are the costs of hypervisor licensing. This was a consistent pain point cited by mid-size enterprises in their responses to researchers’ surveys.

In its July 2014 survey of SMBs, Gartner found that only 18.6 percent of respondents chose converged systems as one of their top three hardware investments for the next 12 months. “We think that current market acceptance of integrated systems in the midmarket is still low due to providers’ lack of concrete value positioning of these systems, coupled with expensive upfront and ongoing support costs,” Gartner said.

8 Federal Reserve, Prices for Data Storage Equipment and the State of IT Innovation, July 2015
9 Gartner, Hyperconverged Integrated Systems Meet Growing Acceptance from Midsize Enterprises, April 2015
However, this picture is rapidly changing at a moment when support for agility in scaling data center resources is reshaping the definition of best practice in IT operations. With growing adoption of HCI technology, Gartner predicts that by 2018, 40 percent of mid-size firms will have replaced all data center servers and storage with hyperconverged or other types of converged systems. Indeed, the firm says, by that year HCI will represent 30 to 35 percent of total converged infrastructure shipments across the entire mid- to large-size enterprise ecosystem.

As Gartner notes, early implementations of HCI were largely driven by mid-size companies’ need to implement virtual desktop infrastructure (VDI) as a way to avoid the complexity, expense and latency of SAN (Storage Access Network)-based solutions. But throughout 2014 the number of general business applications running on hyperconverged systems increased steadily, making clear the fact that HCI is the next step in data center evolution across the entire spectrum of IT operations.

**HYPERCONVERGED INFRASTRUCTURE**

The basic reason for this embrace of the Hyperconverged Data Center 3.0 infrastructure depicted in Figure 2 is the modular scalability HCI brings to software orchestration of the data center in the transition to the private cloud. With elimination of the need to justify big investments in infrastructure expansion based on aggregate IT system requirements, infrastructure investments can be directly responsive to specific business needs.

**Modular Scalability**

All the benefits of virtualization embodied in OpenStack and container technology are preserved in the HCI model but at a much more granular level than is possible with legacy infrastructure or converged systems. Unlike converged architectures where separate storage facilities are attached to physical servers, storage in most HCI solutions is integrated with the computing and networking components within each module or node, typically consuming just one RU of data center space.
Each module is configured with proportionate allocations of compute and storage capacity as dictated by immediate needs. IT departments can make adjustments to those allocations as new modules are added to the cluster.

Storage is tiered within each module to provide RAM, solid state and hard disk drive support as needed. Managers accessing the platform through a single user interface can set policies for each application dictating how much of the computing resources it requires and what data components will be instantly available on RAM, positioned for fast-cache access in Flash or offloaded to the FAS (Fabric Attached Storage) or SATA (Serial Advanced Technology Attachment) components of the storage stack.

Not only does HCI modularity eliminate the need for massive upfront investments in the infrastructure required for cloud-based operations. It allows companies to benefit from the latest technology advances within the same virtualization orchestration framework as vendors introduce modules with improved CPU and memory performance, thereby eliminating the stranded-capital risks of traditional converged infrastructures.

HCI also radically cuts the costs of providing back-up and disaster recovery support for data center operations. Nodes can be added to handle those requirements incrementally in tandem with the expansion of the cluster, not only saving on equipment costs but also reducing file back-up time from hours or even days to minutes. And, of course, with fewer devices deployed HCI takes up less floor space and reduces use of power and cooling systems.

**Cutting Operational Overhead**

Critically, HCI solves one of the other major problems inhibiting mid-size enterprises’ use of the cloud – namely, the amount of time and level of expertise it takes to build software-orchestrated virtualization infrastructures. Initial implementations of HCI for handling one or more IT workflows can be completed in a few hours or even a few minutes.

Scaling out an HCI cluster does not require special cloud-building expertise. Instead, IT teams utilizing the auto-discovery capabilities built into each HCI node can expand the cluster Lego-like one node at a time. They can rely on
pre-set policies to automatically extend assignments of hardware resources to each application horizontally across succeeding nodes. Or they can reset policies through simple point-and-click commands on the management console as the scale-out proceeds.

When it comes to provisioning new applications, HCI radically reduces start-up times. With tight system integration on each node, managers can allocate server and storage capacity on existing nodes or new nodes with a few mouse clicks. IT system activations that once took weeks are accomplished in less than a day and sometime in minutes.

From an ongoing operations standpoint, HCI eliminates the hassles of relying on multiple vendors to provide support for data center software and hardware components. With deployment of fully self-contained HCI systems, there is just one vendor responsible for the performance of all platform elements. Moreover, single pane-of-glass visibility into the system provides access to monitoring data across the entire cluster.

Adding to the cost savings, IT departments utilizing HCI platforms that run on built-in open-source OS like Kernel-based VM (KVM) avoid hypervisor licensing costs. Such HCI solutions also cut operational costs associated with managing multiple systems in the traditional virtualization environment by allowing managers to orchestrate the allocation of hardware resources as well as the instantiation of VMs across the HCI cluster through a single user interface, in contrast to HCI systems that require users to work through third-party VM management interfaces.

**Compatibility with Other Virtualization Environments**

HCI is ideally suited to enabling the incremental movement into a new IT operations paradigm as described in the Gartner bimodal model. In this context, HCI offers major benefits to large as well as mid-size enterprises.

Rather than needing to get buy-in on investments in virtualization by multiple IT teams with agreement on how those costs should be apportioned
Avoiding hypervisor licensing costs, data center applications utilizing existing OpenStack-based virtualization solutions can be brought into the HCI cluster.

In such cases, as digitalization and other new IT applications are implemented utilizing the embedded HCI OS, avoiding hypervisor licensing costs, applications utilizing existing OpenStack-based virtualization solutions in the data center can be brought into the HCI cluster. In well-designed HCI systems, this versatility also applies to instances where legacy modes of virtualization are using Docker, CoreOS Tectonic or other Linux-based container virtualization techniques.

All the HCI efficiencies apply not only to cost effectively building private clouds but also to creating hybrid cloud operational environments where private and public cloud resources are seamlessly integrated. Mid-size enterprises have been limited in their use of public cloud services compared to large enterprises, largely owing to difficulties of porting legacy systems into that environment. Hybrid cloud operations are new to large and mid-size companies alike.

HCI, in cases where solutions are equipped with API support for linking into pre-HCI virtualization platforms supported by public cloud services, provides a means by which companies with limited skills in hybrid environments can exploit the hybrid cloud opportunity. Adaptation to the hybrid model is also facilitated by the fact that most major data center providers and some startups as well have implemented HCI.
Notwithstanding general advantages common to HCI platforms, IT decision makers must be discerning in their selection of HCI solutions to ensure they benefit from all the capabilities of this technology. The checklist for determining whether a given HCI solution achieves that potential includes the following:

- **Minimum entry-level unit size and capacity** – Solutions requiring larger than a single RU module as the starting point for HCI virtualization may be too costly for initial needs.

- **Avoidance of hypervisor licensing** – The solution should provide a self-contained open-source OS stack rather than relying on use of third-party VMs and high-cost hypervisors.

- **Mesh-based scale-out** – As new nodes are added, the expanded cluster should operate as a fully integrated single node rather than as a collection of unitary building blocks. In other words, the solution should support:
  - **Resource allocation scalability and flexibility** – The solution should provide managers maximum flexibility with regard to initial and ongoing adjustments in allocations of compute and storage resources within and across nodes.
  - **Application scalability and workflow flexibility** – Managers should be able to assign resources to multiple applications across multiple nodes and to adjust workflows as needs evolve.

- **High availability** – Just as managers should be able to start from a single module base of HCI operations, they should be able to provide full backup resilience on a one-to-one basis rather than having to invest in three or more backup modules, as is often the case.
→ **Interoperability with existing platforms** – While the HCI platform should operate as a self-contained platform, users should also be able to integrate the HCI into existing virtualization platforms with the ability to run third-party VMs and hypervisors.

→ **Compatibility with containerized applications** – The HCI platform must be able to support Docker, the Linux-based open source container technology, and other container solutions that have begun to supplant VMs in virtualized data center environments.

→ **Hybrid cloud capability** – The HCI platform deployed in the company’s private cloud should support seamless extension of virtualized operations into the public cloud.

→ **Single pane of glass management control** – Many HCI suppliers claim they provide a user interface enabling control over all aspects of HCI operations, but in instances where the vendor’s system runs inside a third-party VM, access to the VM controls requires use of a separate user interface.

All the capabilities discussed above are embodied in the Nimboxx HCI technology. Consequently, the Nimboxx architecture as depicted in Figure 3 represents a major advancement in the versatility and cost benefits to be realized with HCI.
NIMBOXX WHITE PAPER

KEY ATTRIBUTES OF NIMBOXX HCI

Nimboxx has built an extremely flexible, cost-effective HCI platform from the ground up on a set of widely used open-source technologies without reliance on any other vendor solutions. For example, Nimboxx uses the KVM/QEMU hypervisor, eliminating integration and management of third-party hypervisors and the need to pay costly hypervisor licenses. KVM, used as the hypervisor in Google’s Compute Engine and hundreds of thousands of other deployments worldwide, has the fastest growing market share of any hypervisor with a CAGR of over 40 percent.

The operating system at the heart of the Nimboxx “Private-Cloud-in-a-Box” solution is MeshOS, a Linux-based OS utilizing Debian distribution that enables management of converged servers, storage and networking resources in a one RU form factor. Directly accessing bare-metal hardware, MeshOS achieves performance and security benefits that can’t be attained by competitive solutions running in a VM.
The Nimboxx-based cloud can be scaled out starting from a single node, in contrast to other HCI platforms which require investment in three or four nodes as the minimum starting point. As a result, high availability with fail-safe data resilience can be implemented with just two nodes, rather than three or more. As nodes are added, the entire cluster extending to hundreds of nodes is managed as a single node through a single interface to MeshOS, enabling maximum flexibility in the allocation of hardware resources as the portfolio of hosted applications expands.

Operating on the highest performing Nimboxx HCI appliances, MeshOS supports flexible allocation of hardware resources to anywhere from 4.8 to 24 TB of raw storage capacity per node. Multi-tiered caching functions include the ability to aggregate reads and writes in solid-state storage to accelerate underlying I/O streams, enabling storage access at 360,000 IOPs (Inputs/Outputs per Second). Leveraging ongoing gains in processing and storage density, Nimboxx will soon expand the storage capacity to 24 TB per node.

With access to 32 processing cores running in dual multicore CPUs, MeshOS can support up to 200 VMs per node. MeshOS can configure up to ten virtual machine (VM) bridges for secure VM-to-VM communication within a node. It also supports per-VM configurable auto-starts upon node restart.

Managers have control over every aspect of operation through a single interface that treats the Nimboxx cluster as a single node, enabling allocation of processing resources to each application, provisioning of new applications and access to system-wide monitoring, big data analytics and other features across all modules. This is a key point of differentiation with HCI systems that require access through two separate interfaces, one for managing compute and storage functionalities and the other for implementing VMs.

The Nimboxx state-of-the-art approach to HCI infrastructure not only offers major performance benefits over other HCI solutions. IT managers will find Nimboxx HCI systems typically cost 30 percent less than competitive solutions. Power and cooling costs are reduced by as much as 80 percent, and, of course, there are no hypervisor license fees to pay.
ENHANCED HCI FLEXIBILITY

Virtual Desktop Infrastructure

The Nimboxx solutions portfolio is uniquely designed to provide IT departments maximum flexibility in their efforts to capitalize on the benefits of HCI. For example, Nimboxx provides both a software-only solution exclusively focused on support for implementing VDI and one that is designed to work with the MeshOS software stack running on Nimboxx hardware appliances.

For enterprises focused exclusively on launching VDI in their existing data center environments, the Nimboxx VERDE desktop virtualization platform provides a single-stack, single-SKU solution enabling high-performance execution through direct bare metal access to commodity server cores. VERDE, built on open Linux standards with equal support for Windows and Linux operations environments, uses a highly scalable Web 2.0 horizontal model in which each server is a standalone instance of the complete infrastructure. This approach applied to the Branch Office VDI platform design ensures high performance at remote locations without reliance on undependable WAN connections while providing managers in central locations real-time visibility into all virtual desktop sessions running on VERDE cluster servers across the enterprise footprint.

For IT departments that want to exploit the full benefit of HCI for multiple applications in addition to VDI, Nimboxx has an appliance approach to VDI, in addition to the standalone VERDE VDI software. Customers can select VDI support running on 12-core compute nodes, which are one-RU devices running VDI applications that have been tightly integrated with the software running on Nimboxx HCI appliances. Packaged as a HCI+VDI starter bundle, this option features a single compute node which can host up to 100 user desktops and scale into thousands of seats with attachment of additional compute nodes to the HCI cluster.

OpenStack, VMware and Hybrid Cloud Compatibility

Another major aspect to the flexibility of Nimboxx HCI solutions is its compatibility with the OpenStack data center virtualization environment. While utilization of the Nimboxx HCI framework with the pre-integrated
In new hybrid environments, IT departments can use public clouds for spikes in usage on in-house applications while maintaining visibility into all operations. open-source KVM hypervisor enables the most efficient use of processing resources, APIs in MeshOS enable integration of the HCI node as a seamless extension of existing OpenStack virtualization environments, enabling expansion of OpenStack-based operations with the full benefits of the modular scalability enabled by HCI.

In fact, IT departments that want to begin small in virtualizing data centers with implementation of OpenStack can do so using the Nimboxx HCI solution with assurance they will be able to seamlessly expand from that base into OpenStack-based virtualization of large-scale data center resources. In instances where the OpenStack solutions include use of the VMware hypervisor, managers can tap APIs supporting VMware in the MeshOS to greatly simplify integration into the OpenStack environment. Moreover, they can continue using VMware for legacy workloads while supporting new workflows on KVM within the HCI node.

Nimboxx is also enhancing MeshOS to support integration of HCI with container-based virtualization environments. While the most efficient use of Nimboxx HCI entails instantiation of applications on the KVM hypervisor, IT managers who have built private clouds utilizing Docker or other container technology can continue building out the cloud tapping the modular scalability of HCI without foregoing reliance on container-based virtualization.

It’s essential that as enterprises implement private clouds on the Nimboxx HCI platform they have the option to utilize public cloud resources as a fully integrated extension of their private cloud operations. Nimboxx is rapidly expanding its integrations with public cloud service providers to ensure customers will be able to replicate workflows and applications in mirror reflections of the operating environments they’ve implemented with HCI in their private clouds.

In these new hybrid environments, managers will be able to use the public cloud for spikes in usage on in-house based applications while maintaining visibility into all operations through the Nimboxx interface. Similarly, they will be able to designate some applications to run exclusively on public cloud resources and others for operation on the private HCI cloud with single pane of glass visibility into all operations.
CONCLUSION

As HCI has become a force in enabling private and public cloud utilization by mid-size enterprises, ever more companies and institutions have discovered how to maximize the HCI advantage through the advancements achieved by Nimboxx. The diversity of entities that stand to gain from the Nimboxx platform can be seen in customers such as the U.S. Department of Defense; Ludwig-Maximilians-Universitat Munchen (LMU Munich), one of the largest universities in Europe; the prestigious Chuo University in Japan; TRIBE Transportation, one of the fastest growing asset-based minority truck haulers in North America; milling machinery manufacturer Fulghum; residential health facilities provider Nationwide Healthcare Services, and international real estate marketing firm NewPoint Media Group, LLC.

NewPoint Media Group, for example, is a mid-size firm with over 225 employees that had reached a dead end with use of traditional approaches to serving its data center requirements. After researching a wide range of alternatives, the company found the all-in-one Nimboxx solution offered the best way to support a multi-brand expansion that requires distribution of print and digital content to millions of real estate professionals, homebuyers and home sellers each month.

Prior to deploying Nimboxx, the company relied on VMware for virtualization on legacy server hardware, which not only drove licensing, hardware and maintenance costs ever higher as the company expanded but also was inadequate to processing and moving large content-rich files at high speeds. As a result, NewPoint Media Group was forced to spend even more on purpose-built machines to accommodate the expansion, says Robert Berry, the firm’s director of IT.
“Nimboxx allows our organization to eliminate the costly licensing and maintenance that were straining our IT operations,” Berry explains. “With Nimboxx, I don’t need a team of specialized IT gurus, or to send my staff to a week of intense training. The units are easy to set up and manage and because the solution is all-in-one, I have streamlined my vendor operations by working with just one team.”

Another perspective on Nimboxx is offered by Nationwide Healthcare Services, which operates short-term and long-term residential health facilities across the East Coast. The fast-growing organization traditionally maintained a non-virtualized IT environment with physical servers located at its headquarters and all other facilities accessing data via VPNs.

With the Nimboxx platform in place following a successful pilot trial, Nationwide experienced a 5x increase in IOPS compared to previous operations. “In the healthcare industry growth can occur rapidly, and we have to be able to scale our infrastructure quickly without impacting access to critical applications and data such as electronic healthcare records,” says Joe Forman, director of IT at Nationwide. “The Nimboxx system performance has been tremendous from the outset, not to mention the fantastic customer support, with the Nimboxx team quickly responding to all the questions and feedback we’ve shared.”

Such experiences attest to the fact that with deployment of the Nimboxx platform, mid-size enterprises no longer are at a disadvantage when it comes to utilizing the cloud to cut costs and scale operations. With the flexibility to integrate HCI technology into their operations in whatever ways are most advantageous to achieving their goals, IT departments can proceed with expansion into the private and public cloud with minimum disruption and maximum efficiency.