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PROSYS

Tech Outlook

The Agile Data Center

Latest Intel Xeon processors facilitate software-defined infrastructure by delivering a single architecture for compute, storage and networking.

Businesses today demand an IT organization that can react quickly to change and deliver information assets and services flexibly and efficiently. Intel's new third-generation Xeon E5 processors should help IT address those demands by accelerating the transition to software-defined infrastructure.

In the traditional data center model, core infrastructures are assembled using best-of-breed systems for each function. As these infrastructures evolve over time, new technologies are added to further optimize and secure the environment. The net result is a high degree of complexity that limits IT's ability to respond to changing business requirements.

"IT organizations now need a data center infrastructure that is flexible, agile and efficient enough to manage the rapid delivery of new services," said Chee Pung Loy, Intel Solution Provider Manager. "That's why we're seeing the evolution of the software-defined data center (SDDC), in which compute, network and storage resources are fully virtualized. The idea is to eliminate the need for specialized hardware and allow IT to pool all resources required for an application and create a 'logical application' that can be deployed in minutes rather than weeks."

continued on page 2

TECH OUTLOOK

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The Agile Data Center

continued from page 1

Hardware Integration

One of the challenges associated with building an SDDC is the tight integration required between hardware components such as edge and core routers, access and aggregation switches, and application servers and storage. Intel's Xeon E5 v3 product family enables this integration by delivering a single architecture for compute, storage and networking. Diane Bryant, senior vice president and general manager of the Data Center Group at Intel, said this creates efficiencies in hardware development and opens doors for simplified operating models.

"There is a clear value proposition to running all compute, storage and networking workloads on a common architecture," Bryant said at an event for the product launch in September. "We're moving data center infrastructure from static to dynamic, from manual to automated, from proprietary to open standard running on a common architecture."

Visibility is another essential element of the SDDC. Hypervisors don't always provide full visibility into what services are running inside a virtual machine. Sometimes, overhead within an operating system can consume significant resources.

The new Xeon processors include features that provide greater visibility into the system than ever before. A new cache-monitoring feature provides data to enable orchestration tools to intelligently place and rebalance workloads resulting in faster completion times. This also provides the ability to conduct analyses of performance anomalies due to competition for cache in a multitenant cloud environment where there is little visibility into what workloads are running.

The new processors include platform telemetry sensors and metrics for CPU, memory and I/O utilization. With the addition of thermal sensors for airflow and outlet temperature, the visibility and control has increased significantly from the prior generation. The processors offer a holistic set of sensors and telemetry for any orchestration solution to more closely monitor, manage and control system utilization to help maximize data center efficiency for a lower total cost of ownership.

Boosting Performance

The Xeon E5-2600/1600 v3 product families are available in more than 22 options for both single-socket and dual-socket servers to address the requirements of diverse workloads. The new processor families perform up to three time faster than the previous generation Xeon series and can handle six times as much throughput at half the latency.

Combined with the value-added capabilities Intel has baked into the series, the processors offer a powerful value proposition. Intel says the high-end E5-2600 v3 chips can support up to 70 percent more virtual machines than their predecessors. Since hypervisor vendors charge per core, the denser architecture can save a lot of licensing costs in large organizations.

Another addition is support for DDR4 memory, which increases bandwidth through higher speeds while also reducing energy consumption by dropping standard voltage from 1.5V to 1.2V. Intel says its new processors offer up to 44 percent more bandwidth and up to 50 percent greater power efficiency compared to DDR3 memory supported by the previous generation of E5.

The processors are built using Intel's industry-leading and energy-efficient 22nm, 3-D Tri-Gate technology, cutting power consumption while boosting the performance of the transistors. The new "per-core" power states dynamically regulate and adjust power in each processor core for more power-efficient workload processing.

In addition, the new Intel Ethernet Controller XL710 family helps address the increasing demands on networks with capabilities that enable better performance for virtualized servers and networks. The flexible 10/40GB Ethernet controller provides twice the bandwidth while consuming half the power compared to the previous generation.

Security Benefits

The E5-2600 v3 chips can be paired with the Intel Communications Chipset 89xx series featuring Intel Quick Assist Technology to enable faster encryption and compression performance to improve security in a wide range of workloads. Service providers and networking equipment providers can use the platform to consolidate multiple communications workloads onto a single, standardized and flexible architecture to speed up services deployment, reduce costs, and create a more consistent and secure user experience.

Intel says it expects the processors will be used in servers, workstations, storage and networking infrastructure to power a broad set of workloads such as data analytics, high-performance computing, telecommunications and cloud-based services, as well as backend processing for the Internet of Things.

"The digital services economy imposes new requirements on the data center, requirements for automated, dynamic and scalable service delivery," said Bryant. "Our new Intel processors deliver unmatched performance, energy efficiency and security, as well as provide visibility into the hardware resources required to enable software-defined infrastructure. By enabling the re-architecture of the data center, Intel is helping companies fully exploit the benefits of cloud-based services."

News Briefs

Mobile Security Spending on the Rise

Global spending on mobile device and network security infrastructure, software and services is expected to reach $11 billion by the end of the year and grow at a CAGR of nearly 20 percent over the next six years, according to a new report from telecom consulting firm SNS Research.

The immense volume of mobile traffic — SNS estimates mobile networks generating more than 86 exabytes of traffic annually — combined with the growing adoption of open-source operating systems such as Android has opened up new security threats. The firm says mobile malware, SMS spam, cyberattacks and unlawful eavesdropping are an ever-increasing problem for enterprises, consumers and mobile network operators around the globe.

This has, in turn, led to significant investments in integrated security appliances and content security gateways by both enterprises and mobile network operators, besides opening doors for emerging submarkets such as mobile Security as a Service (SEaaS).

Poor Workplace Habits Create Woes

An overwhelming majority of IT administrators say that poor workplace habits such as browsing social media sites, downloading games and plugging in unauthorized devices have become commonplace, according to a recent report from TeamViewer, a provider of remote control and online meetings software.

In the recent survey of 300 IT administrators in the U.S., 92 percent said they have seen these troublesome habits, and 90 percent said these habits have led to problems such as viruses, crashed computers, mass popups and the inability to open email.

Respondents said these behaviors are placing additional strain on IT departments. The study found that 23 percent of IT workers are now putting in between 10 and 20 extra hours, with 4 percent even saying that it has caused them to work more than 40 extra hours in a week.

IT administrators said these conditions are creating a variety of negative emotions, with 70 percent reporting they feel frustrated, 60 percent saying they are angry and 32 percent discouraged. Twelve percent said they feel as though they would like to quit their jobs.

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The Open-Source Cloud

OpenStack promises to speed private cloud deployments, and provide greater flexibility, agility and choice.

Organizations operate in a dynamic business environment that demands fast response to changing business needs, fast deployment of new applications and fast rollout of new services. Users expect high performance and availability regardless of their location or the device they're using.

To meet these demands, the data center is evolving to a private cloud model that provides greater flexibility, agility and scalability while reducing costs. A private cloud enables organizations to focus less on management and maintenance of infrastructure and more on the delivery of services. Resources are centrally controlled and automatically allocated according to policies, allowing IT to quickly deploy the tools users need, such as a new application, service or mobile device.

Getting there isn't easy, however. A 2013 study conducted by IDG Connect on behalf of Red Hat found that internal development of private clouds left organizations with a host of challenges to address. Resource management was the primary challenge (cited by 21 percent of respondents), followed by IT management complexity, application management and application migration (each cited by 18 percent of respondents).

These issues are leading enterprises to adopt OpenStack, an open-source cloud software platform that controls large, scalable pools of compute, storage and networking resources. An overwhelming 84 percent of survey respondents said that OpenStack is part of their future cloud plans, and 60 percent indicated that they are already working on OpenStack deployments.

"The survey findings offer a clear indication that OpenStack is quickly becoming a reality for many IT organizations, and can serve as a viable cloud infrastructure backbone for private cloud," said Radhesh Balakrishnan, general manager, Virtualization, Red Hat. "The survey shows that business leaders understand that OpenStack can bring improved visibility, speed, flexibility and agility to the private cloud."

What Is OpenStack?

OpenStack provides a set of software tools for building and managing public and private clouds. It enables users to deploy virtual machines and other resources on the fly, providing the horizontal scalability that is a hallmark of cloud platforms. These resources are centrally managed and can be provisioned by users through an online interface, reducing management overhead. Management visibility is a key benefit of OpenStack, cited by 73 percent of respondents to the Red Hat/IDG survey.

Another major advantage of OpenStack is platform flexibility, cited by 69 percent of survey respondents. Different systems are available for pri-

vate, public and hybrid clouds, all of which can be highly customized according to business needs thanks to the open-source nature of the system.

OpenStack also provides greater agility, regardless of the type of cloud platform being used. This enables organizations to quickly and easily deploy their cloud systems, introduce new services and respond to changing market conditions. Survey respondents cited deployment speed (72 percent), agility (69 percent) and competitive advantage (67 percent) as benefits that separate OpenStack from other private cloud alternatives.

Like other open-source initiatives, OpenStack is also a global community of developers and technologists who collaborate to create, improve and support open-source cloud infrastructure solutions. The goal of OpenStack is to make it easy for any organization to leverage the cloud on standard hardware and eliminate the limitations of vendor lock-in. Because there is no vendor lock-in, users have the freedom to evaluate more services and tools from more vendors.

OpenStack encourages experimentation and the development of new functionality and features. This do-it-yourself mentality leads to the availability of more plugins and tools that can overcome deficiencies and enhance existing services, benefiting the OpenStack community as a whole.

A New Language

OpenStack comprises a number of components, nine of which are distributed as part of any OpenStack system. These include Nova (also called OpenStack Compute), which enables the deployment of management of large numbers of virtual machines on demand; Swift, an object and file storage system; and Neutron (formerly called Quantum), a cloud controller and software-defined networking project. Horizon, OpenStack's graphical user interface, enables developers to access all of the OpenStack components and provides system administrators with a dashboard view of the cloud as well as management tools.

Those who use OpenStack will need to learn an entirely new terminology. For example, a virtual machine deployed in the cloud is called an "instance," and "flavor" refers to hardware related to a particular instance. Because OpenStack has its own language, it can be difficult to understand and complicated to deploy.

According to the Red Hat/IDG survey, the top challenges to OpenStack adoption include IT staff skill gaps (32 percent) and questions about where to start (10 percent). Survey respondents believe OpenStack vendors and system integrators are best positioned to provide expertise and help justify investments.

A number of vendors have jumped on the OpenStack bandwagon, including Red Hat, IBM, HP and Cisco. 451 Research expects the OpenStack market to grow from $883 million in 2014 to $3.3 billion in 2018, with a significant uptick in revenue from the OpenStack products, distributions and management space.

"OpenStack has seen tremendous growth over the last four years in terms of investment and community expansion," said Al Sadowski, Research Director for 451 Research's Service Provider channel. "The open-source platform is increasingly a consideration for private cloud deployments, and the business models within the ecosystem continue to evolve."

Cisco and Red Hat Expand Partnership for Open Hybrid Cloud

In June 2013, Red Hat announced Red Hat Enterprise Linux OpenStack Platform, a single-subscription offering that integrates the world's leading enterprise Linux and the industry's fastest-growing cloud infrastructure platform. The offering gives organizations the agility to scale and quickly meet customer demands without compromising on availability, security, and performance.

Red Hat Enterprise Linux OpenStack Platform combines:

- Red Hat Enterprise Linux, providing a secure and certified foundation for running OpenStack workload servers (e.g., compute nodes, storage nodes and controller nodes) as well as a scalable, high-performance Linux operating systems for guest virtual machines; and
- Red Hat OpenStack technology, providing a highly scalable, fault-tolerant platform optimized for and integrated with Red Hat Enterprise Linux for the development of a managed private or public cloud for cloud-enabled workloads.

Key to delivering on Red Hat's vision of the open hybrid cloud is its partners. This September, Red Hat and Cisco announced a new integrated infrastructure solution for OpenStack-based cloud deployments. Together, Red Hat and Cisco aim to deliver a set of Intercloud-ready solutions designed to bring OpenStack to enterprise and service provider customers. The work between Red Hat and Cisco will provide fully supported, certified platforms that deliver the open source innovation and optimized functionality needed for building out clouds.

The Future of SDN

Although software-defined networking is gaining traction, work needs to be done before it can go mainstream.

IT departments are evolving from technology caretakers to IT service providers in order to ensure that users have the business services and applications they need. However, increasingly complex enterprise networks have made management equally complex, which forces IT departments to revert to caretaking mode. At the same time, large volumes of data are straining network bandwidth and storage capacity.

Software-defined networking (SDN) promises to overcome these obstacles. SDN separates control from individual switches and routers, which previously had to be configured based on vendor-specific protocols — a time-consuming, resource-intensive process. With SDN, IT can centrally control traffic and manage how applications and services are delivered by programming all physical and virtual devices through a single SDN controller.

SDN makes management much more efficient and improves scalability, providing the flexibility to add bandwidth and devices on demand. Because network resources are automatically provisioned and allocated based upon current business needs, SDN makes it easier to deal with unpredictable network demands without disruption to operations.

Although forecasts for the SDN market vary considerably, all point to considerable interest in SDN. According to Dell'Oro Group, the SDN market is estimated to grow 65 percent to $3 billion in 2014. Estimates from other researchers forecast the SDN market to fall somewhere between $18 billion and $35 billion in 2018.

"SDN is taking center stage among innovative approaches to some of the networking challenges brought about by the rise of the 3rd Platform, particularly virtualization and cloud computing," said Rohit Mehra, vice president, Network Infrastructure at IDC. "With SDN's growing traction in the data center for cloud deployments, enterprise IT is beginning to see the value in potentially extending SDN to the WAN and into the campus to meet the demand for more agile approaches to network architecture, provisioning and operations."

Challenges Ahead

One factor working in SDN's favor has been the push for open-source standards. Open-source standards make the design and operation of SDN simpler and more flexible, while preventing organizations from being tied to vendor-specific devices, software and protocols. The Open Networking Foundation (ONF), a non-profit organization that supports open SDN, introduced OpenFlow, which is widely regarded as the first SDN-specific standard. OpenFlow enables communication between the central controller and network switches, ensuring compatibility and support without vendor lock-in.

"In 2015, I predict that open-source software will be recognized as not only a legitimate but the desirable route to network standards," said ONF Executive Director Dan Pitt. "Vendors will look to open-source software as a way to reduce development expenses on things that don't meaningfully differentiate products. Network operators will begin adopting open-source software directly or indirectly, or by starting a project themselves and sharing with the community to further develop it."

Of course, the initial hype surrounding SDN has blinded many to the obstacles preventing organizations from transitioning to SDN. While open-source standards such as OpenFlow are a step in the right direction, more standards are needed.

Legacy infrastructure can also be problematic if it isn't highly virtualized and doesn't support SDN protocols. Although technology vendors have indicated that some organizations have already moved from the exploratory phase to implementation, it may make

sense for organizations to wait for their next network refresh to consider SDN.

Cutting through Confusion

Two concepts that are very similar to SDN have created confusion in the marketplace. The first is network virtualization, which has been deployed by enterprises for more than a decade. Network virtualization establishes logical, virtual networks by segmenting the existing network at the flow level and connecting each domain virtually rather than physically. Because these virtual networks are separated from network hardware, it becomes easier to move virtual machines without reconfiguring the network.

The second concept is network functions virtualization (NVF), which is designed to virtualize network functions and services that now require proprietary hardware. By running these functions and services in software, organizations can consolidate networking components such as routers, firewalls and load balancers and host them in virtual machines. NVF is primarily used at this point by service providers and telecom carriers, not enterprises.

"While much progress is being made across the NFV ecosystem, we think it will be several more years before large-scale implementations of NFV occur," said Dell'Oro Group Vice President Shin Umeda.

Although security and compliance can be managed more effectively in the long-term, SDN presents short-term security concerns that have given organizations pause. Software-defined security applications are still maturing, and the centralization of control in SDN creates a single point of vulnerability. This can dramatically increase the impact of a breach.

The business benefits are clear and SDN deployments have begun. However, the transition to SDN on a larger scale is likely to take several years. Collaboration between vendors and industry leaders must continue in order to develop standards and best practices that will simplify SDN architecture and keep networks secure. In the meantime, CIOs need to get up to speed on SDN now because a completely different model for network management will be required if organizations hope to remain competitive.

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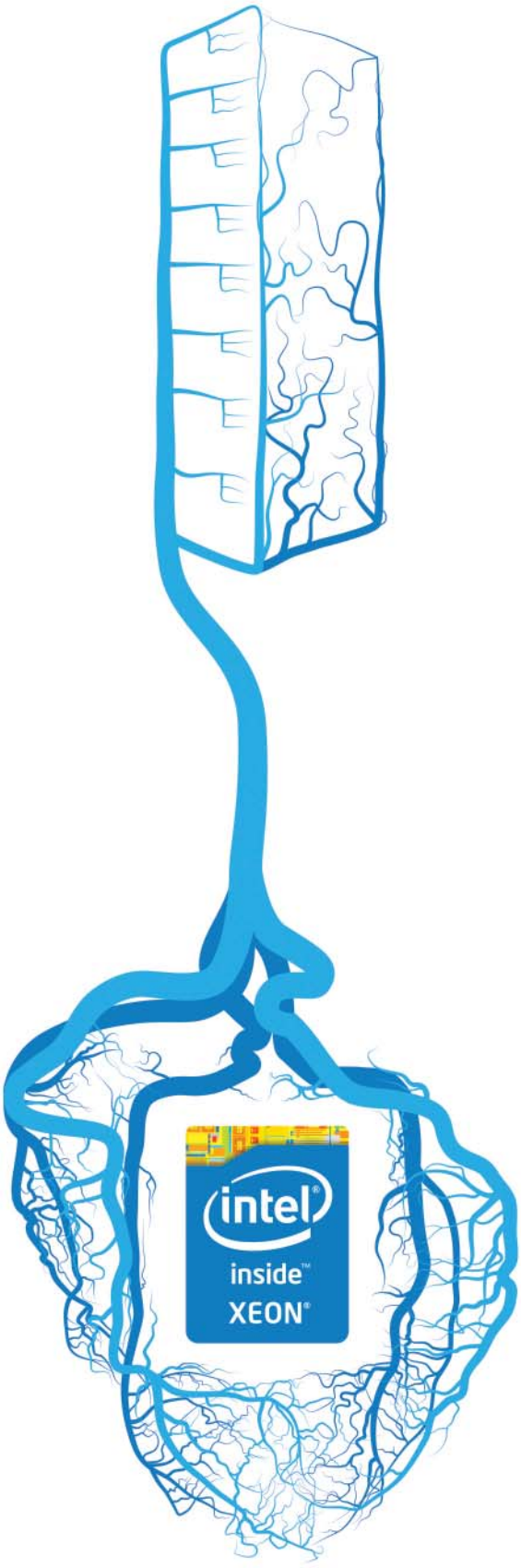

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