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A State of Xen: Virtualization from PDAs to Super Computers

New Xen 3.3 Hypervisor Features Cross Platform Support, Industry Leading Performance, Secure Design and New Features for Embedded Virtualization, All Supported by a Robust and Growing Community

CAMBRIDGE, U.K. – August 27, 2008 - Xen.org, the home of the open source Xen project, has announced the release of Xen® 3.3 engine, the latest version of the industry's leading open source hypervisor. The release is now available for download from the Xen.org community site and is the product of a distributed development effort by senior engineers from more than 50 leading hardware, software, and security vendors (see end of release for supporting comments from some of these vendors). Xen 3.3 includes enhancements that further advance its position as a fast, scalable, secure virtualization engine for the industry's broadest range of server and PC chipsets - from super computers to PDAs.

Since the first release of Xen in December 2005, Xen-based products have quickly gained market share, accounting for almost a fifth of servers virtualized to date.

"The Xen.org community has made security and performance key criteria for the evolution of Xen," said Zeus Kerravala, SVP, Enterprise Research, Yankee Group. "This has been a successful strategy, according to recent Yankee Group survey data showing Xen's rapid growth."

The new Xen 3.3 release provides users with an array of advanced new features and designs to further improve overall performance of the hypervisor engine in mainstream enterprise computing environments. Intel's continued contribution to the Xen project, for example, is driving parallel advances in hardware and software virtualization capabilities to ensure that Xen-based solutions take full advantage of next-generation microprocessor technologies. "At Intel, we continue to enable Xen to take advantage of the advancements in Intel Virtualization Technologies and other platform capabilities," said Imad Sousou, Director of Intel Open Source Technology Center. "Xen 3.3 is optimized for Intel's next generation micro-architecture Nehalem features; enhanced power management, performance, I/O and networking features for building flexible resource management solutions in an energy-efficient data center."

Highest Performance and Lowest Cost for Large Data Centers

The Xen 3.3 engine offers best in class performance for both server and desktop workloads with the highest degree of multiplexing, providing users with the tools to achieve lower hardware costs per virtual machine, with the additional benefit of optimal power usage per server – making it an ideal choice for large data center virtualization deployments. In addition, Xen utilizes both hardware and software techniques to enable it to virtualize both current and legacy operating systems with industry-leading performance. As a result, its architecture has significantly influenced the design of all modern operating systems, including Windows, Linux and Solaris, which gain performance and security from Xen's groundbreaking "para-virtualization" approach. Xen is also superbly matched with leading x86 hardware features for virtualization, to support both legacy and future workloads.

"Xen has become an open source industry standard for virtualization because it leads the industry in performance and support for leading server and PC systems," said Ian Pratt, creator of Xen and founder of Xen.org. "Our open development model, support for industry standard management APIs and our open, active engagement with the security community to secure the hypervisor ensure that Xen continues to outclass proprietary hypervisors. Xen 3.3 further extends our community's lead through significant performance, efficiency and security enhancements and through groundbreaking features for embedded Xen implementations on PCs, laptops and PDAs."

Xen has also become a standard infrastructure component in many of the largest and fastest-growing 'cloud' service providers, and was recently awarded the prestigious InfoWorld 2008 Best of Open Source Software (BOSSIE) award for server virtualization.

From Super Computers to PDAs

Xen 3.3 offers a scalable virtualization engine that leverages a broad range of server and PC chipsets - from super computers to PDAs. It provides highly efficient virtualization for x64, IA64 and ARM-based platforms, and through close links with leading CPU and chipset vendors in the Xen project, Xen 3.3 supports the latest hardware virtualization enhancements, making Xen-based products a natural choice for the latest server, client and PDA hardware. Xen supports many-core CPU architectures, allowing dense consolidation of virtualized workloads on the latest CPUs as well as large numbers of virtual CPUs per virtual machine. With a full 64-bit address space, Xen can take advantage of massive amounts of physical memory, including new flash-memory based stores, and Xen's memory ballooning features permit dynamic reallocation of memory between guest Virtual Machines (VMs), to guarantee performance, and permit greater density of VMs per server. Xen 3.3 now offers CPU portability to allow live relocation of VMs across different CPU feature sets, active power optimization, to reduce power consumption on Xen-based servers and maximize data center power savings, and significantly enhanced security.

Xen 3.3 also contains a wealth of new features contributed by vendors collaborating in the new Xen Client Initiative (XCI), a Xen.org community effort to accelerate and coordinate the development of fast, free, compatible embedded Xen hypervisors for laptops, PCs and PDAs. The XCI is targeting three use cases: using Xen to run "embedded IT" VMs that allow remote support, security and service of PCs through embedded IT applications without any impact on the user's primary desktop OS; "instant on" applications that can be immediately available as separate VMs from the user's primary desktop OS; and "application compatibility" VMs, which allow legacy PC applications to run as VMs, alongside the user's primary desktop OS. XCI member companies are already shipping Xen client hypervisors embedded in chipsets, PCs and laptops.

A Vibrant and Growing Xen Community

Xen.org benefits from broad industry support in the development of the Xen hypervisor, with more than 50 major IT vendors, 14 universities and developers from 12 countries participating in the project's development effort. In addition to its growing development community, Xen-based solutions have been delivered to market by numerous vendors, including Amazon Web Services, Citrix, Fujitsu, Intel, Lenovo, Neocleus, Novell, Oracle, Sun Microsystems, and Virtual Iron, and are available as an embedded option at point of sale on most leading x86 server platforms.

"By using the Xen hypervisor included in SUSE Linux Enterprise 10, our customers obtain real business value with better use of hardware and significant reductions in maintenance and licensing costs," said Holger Dyroff, vice president of outbound product management for SUSE Linux Enterprise, Novell. "Novell plans to include the latest version of the Xen hypervisor in SUSE Linux Enterprise 11, which will feature support for cross-platform virtualization and quality of service for dynamic resources."

Availability

Xen 3.3 is available now. For more information, please visit www.xen.org.

About The Xen Project and Xen.org

Xen.org is the home of the open source Xen® hypervisor, a fast, secure industry standard code base for operating system virtualization. Founded and led by Ian Pratt, the community benefits from the contributions of senior engineers from more than 50 leading hardware, software, and security vendors. Xen.org is run for the benefit of the community by the Xen Project Advisory board, which is drawn from leading contributors to the project. For more information, visit www.xen.org.

<u>**Xen.org Community Quotes:**</u>

"Xen 3.3 is addressing an important need to further performance and security for commercialized industry solutions," said Margaret Lewis, director, Commercial Solutions, **AMD**. "We applaud Xen.org's efforts to fully leverage the support of the Xen community, and we look forward to continuing to support the development of the Xen code."

"The Xen project is a great success story of the open source movement," said Simon Crosby, CTO, Virtualization and Management Division, **Citrix Systems.** "It just two years, Xen has rapidly gained share in virtualization, much as Linux did in operating systems – and in the same period Xen has driven the price of competing hypervisors to zero, allowing any vendor to include virtualization for free. Customers should be aware that simply having a hypervisor is not a value proposition in itself, and that they can now freely choose from multiple vendors that offer powerful value-added features that deliver a secure, available and dynamic virtual data center. The community's commitment to a single open source reference standard for virtualization is extremely powerful, and we all owe a debt to those who have contributed to Xen's success."

"Fujitsu is proud of our contribution to the development of Xen 3.3 which marks another step forward in the evolution of the Xen hypervisor," said Shuichi Hasegawa, general manager of Linux Software Development Division at **Fujitsu**. "We recognize the growing importance of highly scalable and secure virtualization technology in enterprises today. To this end, Fujitsu is also excited to be the key sponsor at the first Xen Summit in Tokyo later this year."

"IBM is a strong supporter of the open source community and has a long history with virtualization, having invented it for mainframe over 40 years ago," said Rich Lechner, Vice President, **IBM** Enterprise Systems & Cloud Computing Strategy. "With that background, IBM is pleased to work with Xen as a key partner, particularly as our clients continue moving to highly-virtualized environments and cloud computing."

"Neocleus is excited to be working with Xen.org on the development of Xen 3.3 and to contribute hypervisor enhancements in order to deliver the most powerful hypervisor engine available to the market," said Etay Bogner, co-founder and chief technology officer, **Neocleus**. "Customers will benefit from the collaborative work Xen is doing across the industry and we look forward to our continued work together."

"Oracle uses Xen as part of Oracle® VM. Our active participation in the Xen.org community and its thorough release process allows us to remain in lockstep with the release schedule," said Wim Coekaerts, vice president Linux Engineering, **Oracle.** "The timely Xen 3.3 release, with the inclusion of the new memory features Oracle contributed to the community, is an example of our strong working relationship."

"The formation of Xen.org has provided a great opportunity for community players to contribute integrated feature sets and ecosystem support enabling enhanced VM assurance, security, IT process controls and VM lifecycle management," says Wyatt Starnes, Founder and CEO of **SignaCert, Inc.** "The addition of critical performance and scalability features to Xen will dramatically increase customer confidence in virtualized computing."

"Samsung Electronics has made contributions to Xen community by releasing the first Xen hypervisor to virtualize an ARM CPU-based mobile platform and enhance the security," said Sang-bum Suh, PhD, Virtualization Project Lead and Principal Engineer, **Samsung Electronics**. "Samsung will actively lead the Xen-ARM architecture. This indicates that using the Xen architecture becomes pervasive to Consumer Electronics devices."

"Sun is using code developed by the Xen community as part of our commercial xVM Server and OpenSolaris products," said Steve Wilson, vice president, xVM, **Sun Microsystems**. "We're pleased to be contributors to the Xen community, and look forward to continued collaboration in the future."

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