SUSE Linux Enterprise-based Technologies and IBM's zEnterprise System

by Meike Chabowski

An Open-Ended Holistic Partnership.

Server proliferation is a widespread industry and data center problem. Whether horizontal, with ever-multiplying racks; or architectural, introducing disparate special-purpose architectures—it causes problems. It's expensive, with minimal economies of scale; it's fragmenting, expanding the number of vendors dealt with; it's difficult, involving staff training and specialization; it's complex, requiring obscure networking connectivity; it's time-consuming, since physical servers can't be provisioned quickly or automatically; and it's environmentally unsound, increasing power and cooling requirements. Running SUSE Linux Enterprise-based technologies on an IBM zEnterprise System can become the perfect remedy to this widespread challenge.

> Linux Quietly Conquers

While Linux still lacks major brand recognition—devices such as Amazon's Kindle, Google's Android, TiVos, the world's Internet servers, and mainframes usually lack "Linux Inside" labels—it's quietly become everywhere. From x86 to mainframe, from netbook to desktop, from network router to Internet server, Linux is the desktop-to-data-center platform that standardizes environments and simplifies management across systems.

This proliferation provides striking simplicity, benefits, value, efficiency, and economies of scale/skills/knowledge—but only if managed correctly.

> The New Linux Math: zEnterprise System = z196 + IFL + zBX + SUSE Linux Enterprise + zManager

Fortunately, once again for mainframes, what's old is new again.

When System/360 began the mainframe era almost five decades ago, supporting both commercial and scientific computing, information technology was simpler than it is today. To accommodate diverse workloads, rather than defining a "one size fits all" solution, S/360 provided a standardized universal architecture available in models ranging from small to massive. Today's System z represents the inclusive mainframe heritage which began with System/360. And instead of being an obsolete and dying technology, System z supports the massive cumulative investment in mainframe applications and systems—what might be called z/Legacy—and a new approach to enterprise computing.

Announced mid-2010, the IBM zEnterprise System consists of the new z196 hardware generation, the zEnterprise Unified Resource Manager (zManager), and the zEnterprise BladeCenter Extensions (zBX). It's a powerful and integrated hybrid system architecture.

The z196, delivering up to 50 BIPS (billion instructions per second), is ideal for data and transaction serving for mission critical applications. The lowest-cost platform for large-scale Linux consolidation, it benefits from a large portfolio of z/OS and Linux on System z applications, as well as those for z/VM, z/VSE, and z/TPF.

The Integrated Facility for Linux (IFL) is a full-capacity processor uniquely dedicated to Linux workloads on IBM System z servers. It is supported by IBM's z/VM virtualization software and Linux; because it cannot run other IBM operating systems, its workloads do not increase IBM software charges for traditional System z operating systems and middleware. An IFL allows you to buy a single software license and share it across many Linux virtual machines. You are charged only for a single processor license, which can mean huge software license savings.

Providing another functional dimension, Linux on System z adds industry-wide open standards to the unmatched power of IBM System z servers. Proven in demanding real-world settings for more than a decade, the first supported enterprise-class Linux operating system was SUSE Linux Enterprise Server for System z. Running this proven operating system on a z196 helps lower IT costs by supporting massive consolidation, while concurrently running diverse mission-critical and infrastructure workloads.

IBM's zBX provides additional integrated infrastructure to the mainframe, managed by the zManager. Built with certified standard components, tested and packaged together, it extends proven System z qualities of service and management capabilities to workloads running on select general purpose POWER7 blades running AIX, IBM x86 Blades running Linux[1], and workload accelerators. The zBX connects to the z196 through a secure, high-performance, private network; it hosts high-performance processors for specific workloads, such as IBM's Smart Analytics Optimizer for DB2 for z/OS.

When IBM will make available the IBM x86 based servers for zBX later this year, SUSE Linux Enterprise Server will be fully supported on this platform. SUSE Linux Enterprise Server integrates the latest virtualization technologies to provision, deprovision, install, monitor, and manage multiple virtual machines (VMs) on a single physical system. It includes full commercial support for Kernel-based Virtual Machine (KVM), an open source full-virtualization solution for Linux on zEnterprise z196 and zBX x86 hardware, and also provides the current Xen hypervisor version.

For maximum flexibility, SUSE Linux Enterprise Server supports all leading open source and proprietary hypervisor technologies and is the optimal host for a virtualized IT infrastructure or the "perfect guest" operating system.

zManager is an integrated System z management facility which centralizes resources and workload management on zEnterprise, extending System z qualities of service across the full system infrastructure. It provides simplified hypervisor installation, a factory-installed and configured network, simplified energy management resource allocation, priority adjustments based on customer business-related policies, and flexibility and consistency of virtualization.

> Software Appliances Simplify Adding Powerful Capabilities

Software appliances are system servers, utilities, and product versions packaged with just enough operating system (JeOS) to perform specific desired tasks. These integrated software applications and purpose-built operating systems contain everything needed to install and boot on standard industry platforms. Preconfigured combinations of applications and operating system integrated into a single image and optimized to run on industry-standard hardware, these compact, self-contained, and self-sufficient tools deploy in minutes, requiring only simple final setup.

[1] At launch of IBM zEnterprise System, IBM had announced as a statement of direction the availability of zBX running Linux on x86 blade servers for 2011.

Appliances are much easier to maintain than traditional software installations and ensure effective configuration and installation. In addition, appliances management is simpler because support teams need not debug complex system environments or distribute software patches not relevant to particular applications.

Since most applications don't require extensive operating system capability, software appliances offer an unprecedented opportunity to reduce application and operating system footprint, along with complexity of installation, maintenance, and support. This simplicity dramatically lowers the cost of customer hardware and software ownership and reduces development, installation and maintenance burdens for software vendors and corporate application developers.

Software appliances are an application developer's or data center manager's dream, because they're:

- Simple
- Lightweight
- Reliable
- Efficient
- Tailorable
- Economical to develop and run

> Rapid Appliance Creation with SUSE Studio and SUSE Appliance Toolkit

SUSE Studio is the fastest and easiest way for independent software vendors (ISVs), IT staff, and developers to create, test, configure and showcase software appliances. It lets users quickly create and test fully supported software appliances based on SUSE Linux Enterprise. SUSE Studio creates images for almost any physical, virtual or cloud environment. With just a few mouse clicks it builds appliances and immediately publishes them in SUSE Gallery.

SUSE Studio eliminates inefficient manual approaches to application deployment by simplifying the process from creation to deployment. In minutes, SUSE Studio builds an appliance with an integrated, preconfigured, and fully supported enterprise-class Linux operating system ready for deployment anywhere from desktop to cloud.

SUSE Studio offers a simple, intuitive interface to build, test, share and download appliances using several starting-point templates, including SUSE Linux Enterprise Server and SUSE Linux Enterprise JeOS. Developers can configure and optimize operating system code needed for specific applications, improving performance, simplifying maintenance, and increasing security.

SUSE Appliance Toolkit provides a comprehensive tool collection for large and very large enterprises, reducing complexity of software deployment, maintenance and support. It is the most efficient way to improve the deployment and maintenance of software applications in physical, virtual and cloud environments. SUSE Appliance Toolkit includes SUSE Studio Onsite, a stand-alone version of SUSE Studio for large enterprises to build software appliances on SUSE Linux Enterprise Server. In addition, WebYaST enables remote configuration for SUSE Linux Enterprise Server via a Web interface. Based on YaST, it provides a framework for remote appliance configuration and creating custom configuration modules—such as license kill switches—embedded in appliances to meet unique remote management needs. Finally, SUSE Lifecycle Management Server, which is deeply integrated with SUSE Studio, is a simple and economical patch tool for creating, managing and updating software appliance repositories.

The SUSE Appliance Toolkit provides:

- Mass customization of the operating system
- Reduced deployment cycles
- Reduced maintenance cost due to reduced software updates
- Increased productivity of deployment and maintenance
- Complete control over the lifecycle of deployed systems
- Complete management and control of deployed software appliances
- Enhanced security with application control and timely updating

The technology to easily build scalable System z server images with the x86-based SUSE Studio/Appliance Toolkit will be made available later in 2011 and will be an ideal workload for zBX blade servers.

> IBM's Smart Analytics Optimizer

IBM's Smart Analytics Optimizer (IBM SAO) is a leading-edge example of a SUSE Linux Enterprise-based appliance, built with SUSE Studio technology. Running in the zBX, it's a high performance, integrated, centrally managed hardware/software accelerator for delivering dramatically faster (5x-80x) analytic query responses.

A workload-optimized database add-on, IBM SAO couples business insights with operational processes by connecting to DB2 for z/OS through deep integration, providing application transparency and accelerating select queries yielding unprecedented response times.

It enables "train of thought" analysis, letting decision makers perform the sort of business analysis never before possible—analyzing trends, predicting outcomes and producing fundamentally better business results. IBM SAO provides:

- Rapid information access to decision makers
- Hybrid computing architectures with fit-for-purpose work allocation
- Ultra-efficient in-memory processing
- Massively parallel architecture
- Optimal row-and-columnar storage technologies
- Highly compressed data and compressed data operations
- Seamless DB2 z/OS connection

> The Perfect Comprehensive Fit-for-Purpose

IBM zEnterprise System combines previously separate architectures into a "system of systems" configured, managed and operated holistically. Complementing this unique hybrid approach, SUSE Linux Enterprise Server from Novell provides the most interoperable and ubiquitous operating system foundation for mission-critical computing. Leadership in systems and application development and operation makes SUSE Linux Enterprise the perfect fit for zEnterprise's groundbreaking technology, which blends heterogeneous architectures into a unified system. SUSE Linux Enterprise Server is the ideal environment for maximizing capabilities, productivity and reliability of all IBM zEnterprise System components.

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