



## **The Odd Couple Gets Engaged — IBM Walks the Walk with Linux for SMBs**

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### **Management Summary**

They say that opposites attract. We see it in life all of the time. Who could be a more mismatched pair than *The Odd Couple*, Felix and Oscar? One is meticulous, the other a slob. Then we have the case of *Mutt & Jeff*, where one very tall person hangs out with one of shorter stature. Could it be that we are looking for someone who does or has what we don't? The slob doesn't want to clean up so he (or she) finds someone who does. We seek complementary relationships.

We see this in sports all of the time, when management seeks to complement the team on the field with some quality that is missing in order to win the big game, i.e., succeed in business. Think here about the baseball team that signs a slugger to complement a weak-hitting team, or signs another pitcher to join the pitching staff. Management is always looking to improve the team, to find another cog in the wheel. The classic case of athletic misfits being thrown together and ending up with the whole being greater than the sum of the parts is the *Oakland Raiders* of the '70's and '80's. The key in all of these examples is success. When individuals sacrifice their own glory, their own image, in a common cause, they end up in a win-win situation.

In the world of Information Technology (IT), there are many examples of products that just naturally go together to solve a business problem, like the personal computer and *MS/DOS*, for example. Because of the advent of the personal computer and development of commodity operating systems such as *Windows* and *UNIX*, applications today such as *Oracle* or *SAP* run under a variety of operating systems and across the gamut of hardware platforms. Servers from companies as diverse as IBM and Sun, from mainframe to desktop, support the same horizontal application set. When the objective becomes trying to reduce the Total Cost of Ownership (TCO), it should not come as a surprise when the largest computer company of all, IBM, forms a series of partnerships based upon the newest operating system on the block, *Linux*, in order to attract new customers from the large pool known as *Small and Medium Businesses* (SMBs).

IBM has established a relationship with both Red Hat and Novell in order to be able to deliver the best high-performance solutions based upon the Linux operating system and the *POWER5* architecture. In order to see how the *IBM eServer OpenPower 720* Linux server and *Express* models can complement standard configurations from the *iSeries* and *pSeries* families to make *POWER5* more attractive for the SMBs, please read on.

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## The Rise of Linux in the Small Enterprise

Small and medium-sized businesses, or SMBs, have an even greater requirement to be able to adapt to changing market conditions, evolve to customer needs, and to respond to new opportunities than major enterprises. They do not have the staff or the resources of their bigger brothers. They need to be flexible and to maintain the agility to change direction at a moment's notice without impacting existing business applications or current customers. Moreover, they need to try to implement any change within the existing corporate infrastructure, while at the same time reducing costs within the scope of the total cost of ownership (TCO).

These ever-changing requirements affect smaller companies in a variety of industries, including financial, manufacturing, services, support, media, transportation, and distribution. Information Technology (IT) departments everywhere must cope with this as they evolve from simple users of file/print services to more complex users of mission-critical applications with the power and capacity to run core business processes. **The key to their survival lies in their capacity to make efficient use of their computing resources.** The difference between merely surviving and prospering can be measured by how reliable, secure, adaptable, easy-to-use, and affordable these systems are.

SMBs can also be faced with the added problem of replacing an aging infrastructure and obsolete platforms. This could result in a forced migration from a legacy architecture to a new environment in order to handle normal business growth.

This new environment will almost always be based upon open-industry standards in order to simplify the infrastructure and to achieve the flexibility and resiliency required to deploy mission-critical applications within a 64-bit architecture. SMBs can also take advantage of the performance of these more powerful application servers to consolidate duplicate activities across the network, eliminating unwanted complexity, in addi-

tion to providing the high-performance platform that their IT requirements demand. There are multiple hardware architectures to choose from to accomplish this implementation, from PCs running Windows to the largest UNIX servers. There is only one open source operating system, however, that crosses all of the barriers between these disparate platforms, and that is Linux.

Linux provides the SMB with freedom of choice with regard to application selection. It is the ideal platform for ISVs to develop and distribute their solutions because of the flexibility of Linux to operate in a heterogeneous environment. These ISVs can sell the same application on every platform from PC to mainframe as long as Linux has been ported to the environment, and today it is safe to say that it has been, regardless of the vendor. Moreover, Linux becomes the ideal vehicle through which to support future growth and, therefore, maintain business flexibility.

Because the cost of implementing a Linux environment is potentially so much less than a comparable UNIX architecture, the SMB can experience a significant reduction in IT operating costs. Combined with the savings that can be realized from a possible consolidation from a distributed Windows environment, the IT staff can lower, significantly, the TCO of the data center.

## IBM and the Entry SMB

Coincidentally, IBM has rediscovered the SMB and has been paying renewed attention to the marketing opportunity that these enterprises represent, with server and storage products from across IBM. These include entry-level servers from the *iSeries* and *pSeries* with new configurations based upon the 64-bit *POWER5* architecture as well as new storage solutions for NAS and SAN, also based upon POWER microprocessors. With POWER everywhere, IBM has made Linux available, everywhere. Wherever the data center can install a POWER server, application, or storage, Linux becomes a viable solution in that space. Linux is also avail-

able on the *eServer xSeries* systems and *BladeCenter*, as well as the *zSeries* main-frame, to make it a truly cross-platform solution.

In order to make the greatest selection of Linux applications available on POWER servers for both the *iSeries* and *pSeries*, IBM has created partnerships with both Red Hat, for their *RHEL* version of Linux, and with Novell, for their *SLES* version. In fact, the Linux kernel in SLES 9 leverages POWER5 to take advantage of high-performance characteristics like improved memory access and virtualization features, like simultaneous multi-threading. (See Exhibit 1, below.) The Red Hat RHEL AS 3 version will support them when it becomes available.

IBM's expanding role in the development of 64-bit architectures provides the ideal platform for Linux gurus, developers, clients, and the academic community alike, to implement Linux solutions on the POWER5 microprocessor. It is a stable environment with outstanding performance, so powerful in fact that the SMB can complete his mission-critical solution with far fewer processors than would be required in an x86 or SPARC environment.

Use of the POWER architecture for Linux solutions enables an almost complete set of resiliency features. (See Exhibit 2, in next column.) That makes this architecture ideal in a mission-critical atmosphere, not as complete as with AIX, but significantly more extensive than those available for

#### Exhibit 1 - Advanced OpenPower Virtualization Features

- Simultaneous Multithreading
- Logical Partitioning to allow multiple iterations to run simultaneously
- Dynamic LPAR (Only with SLES 9)
- Micro-Partitioning
- Virtual LAN
- Virtual Storage
- Virtual I/O

#### Exhibit 2 – OpenPower RAS Features

- IBM Chipkill ECC, bit steering memory, ECC L2 cache, L3 cache
- Service Processors
- First Failure Data Capture
- Logical Partition error containment
- Hot-swappable disk bays
- Hot-plug PCI-X slots (on base system and I/O drawers)
- Blind-swap PCI-X slots on I/O drawers
- Dynamic de-allocation of logical partitions and PCI bus slots
- Hot plug and auto-ranging power supplies with optional redundancy and
- Redundant cooling fans; optional redundant power supply

Linux with Intel processors. This capability improves system utilization, reduces downtime, and lowers system management costs.

With the availability of POWER5, IBM has enabled a new series of *p5* and *i5* platforms, less costly yet more powerful than the previous *POWER4* solutions, and significantly more performant than any of the competing AMD *Opteron*, Intel *Itanium*, or Sun *SPARC* platforms in this 64-bit arena. This has also enabled IBM to introduce a new line of entry-level platforms, tuned for Linux, starting with the *OpenPower 720*.

#### New POWER Platforms

The OpenPower 720 is the most flexible and affordable 64-bit platform designed for Linux. Based upon the POWER5, it can take advantage of all of the high-performance characteristics that POWER5, has to offer, such as improved memory access.

The OpenPower 720 may be configured as a mono-processor running at 1.5 GHz, or a dual- or quad-processor running at 1.65 GHz with up to 72MB of 4-way L3 cache. It may be configured with anywhere from 512MB of memory to 64GB, with up to 1.2

TB of internal storage. In addition, the 720 comes with a dual-ported internal Ultra320 SCSI controller with an optional RAID interface, and dual integrated attachment ports for an assortment of I/O interfaces:

- 10/100/1000 Mbps Ethernet
- HMC (Hardware Management Console)
- RIO-2
- USB 2.0

Moreover, it is configured with both hot-plug and redundant power supplies and cooling fans. With a starting price of only \$5,000, the system comes with a three-year warranty and is available for either rack-mount or desk-side installation.

Based upon performance benchmarks such as the *SPECjbb2000*, *SPECCompM2001*, and *SPECsfs97\_R1.v3*, the OpenPower 720 with a quad-POWER5 CPU outperforms its 64-bit competition from AMD, Intel, and SUN in terms of Java serving, high-performance computing, and file serving.

In addition to the OpenPower 720, IBM also offers a complete family of *p5 Express* configurations: the *p5-520*, *p5-550*, and the *p5-570*. These servers come with the same RAS features of the OpenPower system, with optional virtualization to enhance performance. Moreover, they have the flexibility to run *AIX 5L*, v5.2 or v5.3, as well as Linux, including both the Red Hat and Novell implementations. This enables the SMB to have access to the entire library of AIX applications in addition to all of the open source Linux solutions. The *p5-520 Express* may be configured as a mono- or dual-processor POWER5 at 1.5GHz, with the mono-CPU system starting at under \$5,000. The *p5-550 Express* may be configured as a mono-, dual-, or quad-processor, with the mono-CPU system starting at \$10,000, while the *p5-570* may be configured with eight POWER5 CPUs, with both systems running at 1.5GHz. Both servers may be installed in a desktide or 4U rack-mount configuration with Value Packs for entry UNIX or Linux OS servers.

The mono-CPU *p5-520 Express* has an

*rperf* (relative performance) index of 3.25 with AIX 5L V5.3, while an eight CPU *p5-570 Express* is measured at 34.46 with the same OS. This satisfies the scalability required by SMBs in order to protect their investment in new computing resources. Linux on POWER is also available for IBM's BladeCenter, using the JS20 Blade, for additional cross-platform compatibility.

## Conclusion

IBM has recognized a breakthrough product and they have responded accordingly. They have made mission-critical Linux available on every IBM platform from the xSeries and BladeCenter through the zSeries mainframes. Special attention, however, has been devoted to the mid-range, commodity-class platforms based on the high-performance POWER5 architecture, the iSeries, and the pSeries. Make no mistake; with 20% annual growth, Linux has become a mainstream enterprise operating system.

**With a growing catalog of integrated solutions tailored for the Linux market, IBM appears to have made a commitment to the SMB Linux community to deliver enterprise productivity at breakthrough pricing.** They have delivered this through a flexible, customer-centric architecture that stresses decreasing the TCO of the data center through IT simplification while at the same time implementing mainframe-inspired RAS in the data center. They have overwhelmed the competitors trying to satisfy **this market solely with x86 products.**

IBM has done more, however, than simply pre-package Linux on Power5 platforms. They have made a commitment of resources through training, support, and porting assistance. IBM has opened a Linux Technology Center, with 600 engineers devoted to Linux systems throughout the company, 150 of them implementing Linux solutions on the POWER architecture.



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