IBM Declares Open Season on Sun — OpenPower with Linux Challenges Solaris

Analyst: David Reine

Management Summary

Automobiles are the major transportation vehicle for hundreds of millions of people around the world. They have a utilitarian purpose that was made perfectly clear in the recent tragedy in New Orleans where people with cars were able to avoid disaster and relocate to other parts of the country. Automobiles also reflect the personality of their owners and we fall in love with them. We name them, we pamper them, and we try to protect the investment that we have made in them. However, as they age, they can breakdown and they can become expensive to maintain. Most repairs during the first few years of ownership are covered under a Manufacturer's Warranty. After the warranty has expired however, the cost to continue to keep them on the road gradually rises. As long as the dealer continues to provide economical service, we continue to return to that dealer for repairs. Unfortunately, at some point, return on investment in repairs exceeds the value that the auto retains. When that occurs, drivers are tempted to look around at other manufacturers, other dealers, to determine if there is another vehicle with better functionality (a hybrid engine, perhaps) that is better suited to a more modern lifestyle (or more expensive gas).

A similar story is occurring with increasing frequency in the Information Technology (IT) arena. Enterprises everywhere, whether Fortune 500 or SME, are experiencing the aging of enterprise servers that were acquired during the Y2K boom years when new servers were purchased to avoid the potential catastrophe feared when the calendar turned the fateful page from 1999 to 2000. Other enterprises may have slightly newer servers, acquired from eBay during the garage sale that occurred after the dot.com crash a few years later. Many of those servers were supplied by, and maintained by, Sun Microsystems. These enterprises have been running their mission-critical applications on *UltraSPARC II and UltraSPARC III*, or Intel, based platforms running under Sun's *Solaris* operating system for the past decade. These servers have been aging, some less gracefully than others. Newer technologies (several generations, in fact) have surpassed the capabilities of the hardware and newer open source operating environments (i.e., *Linux*) have reduced the cost of everything from application acquisition to support personnel. As CIO, you must look at alternatives that will lower the total cost of ownership (TCO) of the data center.

One of those alternatives is provided by IBM with their *OpenPower* server, integrated with the Linux operating system. Teaming with a network of ISVs who are facilitating the transition and consolidation of Solaris applications to Linux, IBM is delivering a 21st century solution with more performance and more functionality than might currently exist in your data center. To see if OpenPower and Linux can reduce your TCO, please read on.

The CIO's Data Center Quandary

The overwhelming requirement of CIOs across industries and enterprises of all sizes is to reduce overall business costs without impacting data center performance. In fact, most enterprises need to reduce cost *and* improve performance, especially with complexity and administrative costs growing faster than hardware cost. This is an interesting dilemma. How do you increase data center performance while maintaining the same level of system reliability, availability, and serviceability (RAS), at the same time lowering the TCO of that facility?

The first thing that you must do is to take a step back and review the existing enterprise IT infrastructure. Regardless of the name on the logo or the operating environment managing the servers in your data center, many of the problems that CIOs are experiencing today revolve around the inefficiency of older servers and the costs associated with keeping obsolete[1] equipment operational. The typical data center is utilizing less than 25% of the CPU capability of the average UNIX server, with x86 servers even lower. Besides being driven by CPUs that are significantly slower than their "modern" counter-parts, many older platforms simply do not have the capability to virtualize their environment, to share their resources dynamically between mul-tiple applications. This precludes the capability of making use of idle CPU power with the intro-duction of other solutions into the server environment. These capabilities would enable the data center to respond more quickly to new or changing enterprise goals or to consolidate the enterprise IT infrastructure on fewer platforms. In many cases, older servers preclude the capability of running multiple operating systems simultaneously, such as UNIX and Linux. The cost of keeping hundreds of under-utilized servers operational can become prohibitive, especially when you include the cost of administrative personnel as well as the electrical resources required to run the servers and cool the data center.

In addition to the inefficiency of the existing server network and an increasing number of outages resulting from age which reduce server reliability, data center management must also absorb annual increases in maintenance fees, anywhere from 8 to 15% annually. With mission-critical applications already suffering from increased response times due to the additional workload resulting from increased demand, the enterprise can ill-afford to continue with the existing architecture. Change is mandated, but what form should the change take?

The IT industry has been moving away from proprietary 32-bit architectures and moving toward an open source environment with 64-bit addressability for quite some time. This is characterized in two ways:

- System vendors such as HP[2] and Groupe Bull[3] emulating their proprietary environments (e.g., HP-UX and GCOS) on 64-bit commodity microprocessors, such as Intel's *Itanium 2*, designed to replace RISC systems; or

- Migrating to open systems servers based upon commodity architectures such as the *POWER5* microprocessor from IBM, *Xeon* from Intel or *Opteron* from AMD, along with the Linux operating system.

Linux had already been accepted as a standard environment, along with Windows, for infrastructure applications, such as email and file services. Now Linux has been approved as a standard operating system for the execution of mission-critical enterprise applications replacing legacy systems, as long as the server platform can retain, or increase, its RAS capability. A major factor in the development of mission-critical Linux applications is the availability of Linux on a wide range of platforms, including low-cost x86 and x64 platforms, a wide range of RISC systems, and mainframes. In addition, there is a plethora of Linux programmers coming out of our educa-tional institutions to fill critical roles in development and administration throughout the IT industry.

Today, many data centers are looking to replace the infrastructure and mission-critical UNIX servers that have been running their enterprises over the last decade. They are also looking to consolidate these applications in order to reduce the TCO of enterprise facilities. A significant number of these data centers employ

---

[1] For the purpose of this discussion, "obsolete" refers to any server which is off warranty, requires the payment of maintenance charges, and whose upgrade cost is prohibitive.

[2] See **The Clipper Group Navigator** dated July 29, 2003, entitled *HP Takes First (Super-sized) Step Toward Product Line Consolidation (Simplification)* at http://www.clipper.com/research/TCG2003034.pdf.

[3] See **The Clipper Group Navigator** dated October 15, 2003, entitled *Bull Transitions GCOS8 to Open Systems - NovaScale 9000 to the Rescue* at http://www.clipper.com/research/TCG2003053.pdf.

Sun servers with the Solaris operating environment. This was the environment that met the growing needs of an expanding Internet during the pre-Y2K boom years, before Wintel machines began to fill their infrastructure role and Sun began its fall from grace after 2001. In 2001, Sun reported sales in excess of $18B, in the most recent report, that figure is <$6B. **A decision must be made now whether to remain with Sun and Solaris, replacing the existing environment with Solaris 9 or 10 on the latest** *Sun Fire* **platform, UltraSPARC or Opteron, or to choose this time to migrate to an open systems platform with an open source environment.** As Sun users would already be familiar with Solaris, let's take a look at the open source alternatives.

The Arrival of Linux

Linux is recognized today as the fastest growing open source operating environment. With a generally-recognized revenue stream of around $2B per year for the period 2000-2003, Linux shipments have now soared, with an projected revenue stream of about $6B in 2005, and expected revenue of $10B by 2008. Linux can be found today in all major industries from Manufacturing to Finance to Retail, as well as in government offices at both the local and federal levels. This includes all versions of Linux, although the leading implementations are those from Red Hat and Novell, with *Red Hat Enterprise Level 4* (*RHEL4*) and *SUSE Enterprise Server 9* (*SLES9*). This rapid acceptance confirms the fact that Linux has been accepted in all enterprise environments, not just web infrastructure. (See Exhibit 1, at the right.)

Because of its unmatched versatility, Linux provides the perfect migration destination for data centers executing growing UNIX workloads on aging servers with inadequate performance. Linux enables the IT staff to migrate to a non-proprietary environment and reduce costs through:

- **Simplification** – by consolidating server sprawl onto fewer platforms, lowering on-going maintenance fees, and removing vendor indecision over proprietary platform roadmaps from data center expansion strategy;

- **Reduction in TCO** – by adopting an Open Source environment to reduce not only licensing and support charges for the operating environment, but also providing UNIX

Exhibit 1 – Common Linux Workload Environments

- IT Infrastructure
- Web Infrastructure
- Technical High Performance Computing
- Application Development
- Decision Support
- Business Processing
- Collaboration

---

workloads and reliability at commodity prices; and

- **Access** – to a vast, and growing, development/support community producing an extensive base of infrastructure and business-critical applications previously only available for UNIX architectures.

With thousands of open source applications available, Linux can improve the ROI equation for the enterprise with low-cost software solutions. Furthermore, the IT staff can implement with flexibility as Linux provides a cost-effective, secure environment, powerful enough to run business-critical applications across a wide variety of platforms, including PCs, workstations, open source servers, and mainframes. In addition, Linux supports the RAS features that provide the reliability that any CIO demands for the mission-critical enterprise server. In fact, Linux is becoming the reference platform for enterprise databases and system migrations. (See Exhibit 2, on the next page.)

For those enterprises, large or small, who are running on obsolete Sun platforms and are looking to upgrade their platform, renew their hardware service agreement, or transition away from a proprietary UNIX environment, IBM has teamed with LINUX providers Red Hat and Novell to deliver a solution optimized to the *POWER* environment – enabling your enterprise to migrate from Solaris to Linux and enjoy the performance and virtualization features intrinsic to an *OpenPower* framework.

OpenPower to the Rescue

Teaming with Red Hat and Novell, along with a host of independent software vendors (ISVs), IBM has packaged a set of solutions to address the three biggest IT questions:

1. Will this solution lower the TCO and enable the enterprise to respond dynamically to changing business conditions?

2. Is this a better RAS solution? and

3. How available are applications?

Due to the desire to maintain the lifecycle of existing proprietary environments, and a general lack of interest within the IT industry relative to the acceptance of Linux as a major operating system, IBM has been allowed to forge to the front of the pack and remake itself into a champion of Linux. With over 600 people assigned to Linux projects and the implementation of a Linux migration factory in Austin, IBM has positioned Linux as the open source alternative to legacy environments on every platform from PCs to mainframes. IBM has taken a particular interest in low-cost Linux systems, teaming the open source flag-bearer with their own high-performance POWER5 engine, creating the OpenPower platform, first with the dual-core, quad-CPU *OpenPower 720*[4], with an entry price starting at $5,000[5] and then with the even lower-cost dual-core, 2-way *OpenPower 710*[6], priced at under $3,500. Support for Linux is also inexpensive, beginning as low as $295 for a one-year standard subscription for Red Hat's *RHEL AS 3* on a 1-2 processor system, or $495 for Novell's *SLES 9*. Both Linux and Solaris have a variety of support offerings, standard and premium, based upon hours of service and response time. While Solaris support is based upon the number of processors, IBM positions OpenPower support on two levels: one for dual-CPU and the other for up to 8-way.

In addition, IBM has tuned Linux for the *p5* environment included in *BladeCenter*, with the dual-processor *JS20* blade. With industry-leading performance on a wide variety of standard benchmarks and with a published POWER roadmap through 2008, the data center can identify with these scale-out platforms and plan enterprise

---

4 See **The Clipper Group Navigator** dated October 29, 2004, entitled *The Odd Couple Gets Engaged – IBM Walks the Walk with Linux for SMBs* at http://www.clipper.com/research/TCG2004089.pdf.

5 A fully configured OpenPower 720 with 4 processors, 8GB memory, 4.73GB 10,000RPM disks, RAID controller, redundant power, GigE NIC, DVD-ROM, and Next Business Day Warranty is priced at $22,519.

6 See **The Clipper Group Navigator** dated January 26, 2005, entitled *IBM Continues Linux Push With Streamlined OpenPower and S/W Solutions* at http://www.clipper.com/research/TCG2004089.pdf.

**Exhibit 2 –
Reasons to Migrate to Linux**

- 16-way+ scalability
- Hyperthreading performance capability
- Sub-processor partitioning support
- Open Source Cost Reduction
- Platform Reliability and Resilience
- Access to Alternative Platforms with Improved Performance
- Availability of Application Development and Support
- Access to New Application Solutions, Middleware and Tools
- Improved Compatibility through Open Source Standards

---

upgrades for the long run. In addition, with a three-year warranty covering on-site repair from 8:00 AM to 5:00 PM on weekdays, the enterprise can easily ascertain the TCO for that period.

There is no question as to the viability of OpenPower's infrastructure. Based upon the same architecture as the *pSeries,* OpenPower enjoys the same RAS features (see Exhibit 3 on the next page) and will gain from advancements to the processor for enhanced virtualization, higher frequencies, and an improved memory subsystem. With this functionality driving up availability, the MTBF is measured in decades.

Now, IBM has teamed up with a wide-range of business partners and software houses to provide a high-performance, low-cost, scale-out response for the open source community who have been attempting to provide mission-critical solutions on:

- x86 platforms lacking the resiliency required for mission-critical solutions; and

- Under-powered Sun platforms which have become obsolete, unreliable and too expensive to maintain in 2005.

Today's OpenPower has significant advantages over the older SPARC technology, which you may have in your data center:

- Simultaneous multi-threading – utilizes unused execution cycles to improve performance by 10 to 50% depending upon the benchmark;

**Exhibit 3 –
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

- Virtualization Manager for Micro-partitioning, Dynamic LPARs, storage and I/O – enables multiple applications to share a processor via workload management; and

- Extended RAS features – to avoid failures, to keep the application running, to isolate the failure, and finally, to recover the server.

In addition, because it is based upon POWER5, a single binary is also supported on: BladeCenter for high-density, high-performance, scale-out requirements; iSeries for SMB iSeries environments; and pSeries for enterprise Linux requirements in heterogeneous data centers.

There are over 5000 industry applications and open source tools available on Linux with over 1,300 already validated on POWER, including major horizontal applications such as *Oracle* and *SAP*. If you want to move your existing application environment to Linux, companies such as Aduva are available to provide powerful, GUI-based tools for the management of OpenPower consolidation. IBM has also made available, on their website, a guide to port from Solaris to Linux for both POWER and x86 environments. Both IBM and their partners are also prepared to deliver a variety of professional services to enable you to create a Linux strategy, determine readiness, formulate a discovery workshop, and deliver migration skills.

Conclusion

Why IBM? Why OpenPower with Linux? IBM has married the open source advantages of Linux with the technological features of the p5 architecture to deliver a data center ready platform focused on solutions. By utilizing the virtualization and RAS capabilities of the Open-Power environment, **IBM has delivered a consolidation platform that can drive up the availability and productivity of the data center while driving down the TCO with low-cost two- and four-way servers**. The data center can now make more effective use of each and every platform to ensure greater than 75% CPU utilization. IBM has adapted the on-demand features of the pSeries to a scale-out, open systems platform. By championing Linux, instead of ignoring it, IBM has taken open source solutions to a new level, an enterprise level, with features previously reserved for the mainframe. **By implementing a Linux solution, the enterprise regains the power and leverage lost when the data center installed a proprietary solution.**

While IBM has committed to Linux, Sun is still committed to Solaris as an open source solution. If you are committed to reducing enterprise TCO, you will need to work within the open source community for low-cost commodity applications, which can benefit the enterprise financial statement. If your enterprise is committed to Linux, you will need to see what OpenPower can do for your enterprise.

About The Clipper Group, Inc.

The Clipper Group, Inc., is an independent consulting firm specializing in acquisition decisions and strategic advice regarding complex, enterprise-class information technologies. Our team of industry professionals averages more than 25 years of real-world experience. A team of staff consultants augments our capabilities, with significant experience across a broad spectrum of applications and environments.

➢ *The Clipper Group can be reached at 781-235-0085 and found on the web at www.clipper.com.*

About the Author

David Reine is Director, Enterprise Systems for The Clipper Group. Mr. Reine specializes in enterprise servers, storage, and software, strategic business solutions, and trends in open systems architectures. He joined The Clipper Group after three decades in server and storage product marketing and program management for Groupe Bull, Zenith Data Systems, and Honeywell Information Systems. Mr. Reine earned a Bachelor of Arts degree from Tufts University, and an MBA from Northeastern University.

➢ *Reach David Reine via e-mail at dave.reine@clipper.com or at 781-235-0085 Ext. 123. (Please dial "123" when you hear the automated attendant.)*

Regarding Trademarks and Service Marks

The Clipper Group Navigator, **The Clipper Group Explorer**, **The Clipper Group Observer**, **The Clipper Group** *Captain's Log*, **The Clipper Group Voyager**, and *"clipper.com"* are trademarks of The Clipper Group, Inc., and the clipper ship drawings, *"Navigating Information Technology Horizons"*, and *"teraproductivity"* are service marks of The Clipper Group, Inc. The Clipper Group, Inc., reserves all rights regarding its trademarks and service marks. All other trademarks, etc., belong to their respective owners.

Disclosure

Officers and/or employees of The Clipper Group may own as individuals, directly or indirectly, shares in one or more companies discussed in this bulletin. Company policy prohibits any officer or employee from holding more than one percent of the outstanding shares of any company covered by The Clipper Group. The Clipper Group, Inc., has no such equity holdings.

Regarding the Information in this Issue

The Clipper Group believes the information included in this report to be accurate. Data has been received from a variety of sources, which we believe to be reliable, including manufacturers, distributors, or users of the products discussed herein. The Clipper Group, Inc., cannot be held responsible for any consequential damages resulting from the application of information or opinions contained in this report.