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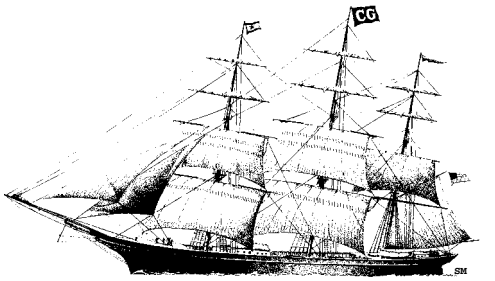

Navigating Information Technology Horizons℠

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IBM Introduces *eServer i5* — A Recipe for Success

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Management Summary

Over the past four decades, the computer industry has seen the slow but steady migration of a variety of mid-range proprietary systems out of the data center, as open systems servers achieve greater performance, greater connectivity, and greater reliability. In some cases, computer companies have moved their mini-computers from the "Glass House" to the museum. With an end-game strategy that thanks their customers for years, even decades of loyalty, they tell them that it is time to move on to their newest products and to rewrite their mission-critical applications for a newer, more fashionable microprocessor strategy. Others have simply thrown in the towel telling their customers to find a new vendor. Who remembers the Data General *Nova* introduced in 1968? In fact, who remembers Data General? The same is true for Prime Computer, another manufacturer of mini-computers from the 20th century.

We can also look at Digital Equipment with the *VAX* and Hewlett-Packard (HP) with the *HP 3000*. The VAX disappeared from the DEC-Compaq-HP price book some time ago, and now HP tries to migrate its customers to the Intel Itanium architecture, with the same strategy in order for their HP 3000 users. This transition forces the IT staff to learn a new architecture in order to maintain the mission-critical applications vital to the operation of the enterprise. There is no easy path to upgrade systems from one environment to another, when fundamental changes are involved. There is no easy path to join the mainstream of open system development. Or is there?

IBM has developed a unique game plan to transition their OS/400 customers from the 1980s into the 21st century - *if they retain the interface, they can retain the same customers*. IBM joined the mainstream of microprocessor development for their mini-computer line by transitioning the *AS/400* during the year 2000. They had incorporated the *POWER* architecture, shared with the IBM *pSeries* (née *RS/6000*), into the AS/400 in 1995. There was no change in programming culture and no application rewrite required to achieve 64-bit compatibility. IBM simply adapted OS/400 to the new environment and allowed their installed base to continue to use their mission-critical application base without having to engage in crisis management. As IBM continues to maintain pace with Moore's Law, increasing CPU performance every 18 months, they have now taken advantage of the development synergy between the pSeries and the iSeries to introduce a new transition path for OS/400, the eServer i5. To find out how your data center can take advantage of POWER5 to increase enterprise profitability, please read on.

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The Rise of POWER

Since 1994, IBM has continually improved the CPU performance and reliability of the AS/400, evolving the platform from a CISC-based architecture to a RISC-based environment, starting with the Cobra version of the PowerPC microprocessor. Since the *AS/400* evolved to the *iSeries* in 2000, IBM has continued the availability of *OS/400* on an evolving stream of *POWER-based* CPUs.

Over the years, the *POWER* microprocessor family has evolved into a commercial processing super-chip, as well as a cornerstone for any scientific computing requirements. IBM created a relative performance index, known as *rPerf*, in an attempt to measure the growth in performance of the CPU. While the server architecture has an influence on the rPerf numbers, they do provide a measuring stick to evaluate IBM's progress with POWER. The *POWER3-II* microprocessor at 375MHz represents an rPerf value of 1.00 with all other versions measured against it. See Exhibit 1 for rPerf ratings since 1998.

With the availability of *POWER5*, IBM takes another giant leap forward in processing capability. Significantly, IBM made that leap by announcing the arrival of the newest iteration of its mainstream microprocessor line as a member of the iSeries, the *eServer i5*, into the data center. **eServer i5 is the first POWER5 processor-based server in the industry**. The design of POWER5 boosts the individual processor performance and aggregate server bandwidth of the eServer i5 to an extent that Intel will not be able to match until the availability of *Montecito*[1] and *Tanglewood*, multi-core *Itanium* processors. In addition to the hardware upgrade, IBM also announced an upgrade to the operating system. As with the hardware, the improvements made to the *OS/400 V5R2* software are so extensive that IBM made the decision to rename the operating system as well. The new name is *i5/OS V5R3*.

The i5/OS will share the *POWER Hypervisor* with the *pSeries*, which means that later this year the eServer i5 will be able to run native *AIX 5L* partitions alongside partitions running i5/OS and Linux. In addition, the eServer i5 will continue the capability to share its resources with the *eServer xSeries* platforms under the *IBM Virtualization Engine*, introduced with the i5/OS. (See Exhibit 2 and discussion that follows, on the next page.) The economies of scale that IBM achieves by using a common platform for both the pServer and the eServer i5 is significant and manifests itself in the price reductions made to the i5.

Exhibit 1 – Relative Performance for POWER

Chip	MHz	Min rPerf	Max rPerf
PPC604e	250	0.18 (1-way)	
PPC604e	375	0.26 (1)	
RS64 III	450	0.93 (1)	3.55 (4)
RS64 III	500	2.49 (2)	8.53 (8)
RS64 IV	600	1.26 (1)	4.57 (4)
RS64 IV	750	1.91 (1)	13.28 (8)
POWER3	375	1.00 (1)	1.92 (2)
POWER3	450	1.19 (1)	2.27 (2)
POWER4	1000	1.72 (1)	7.12 (4)
POWER4	1100	10.18 (4)	60.66 (32)
POWER4	1300	21.20 (8)	71.44 (32)

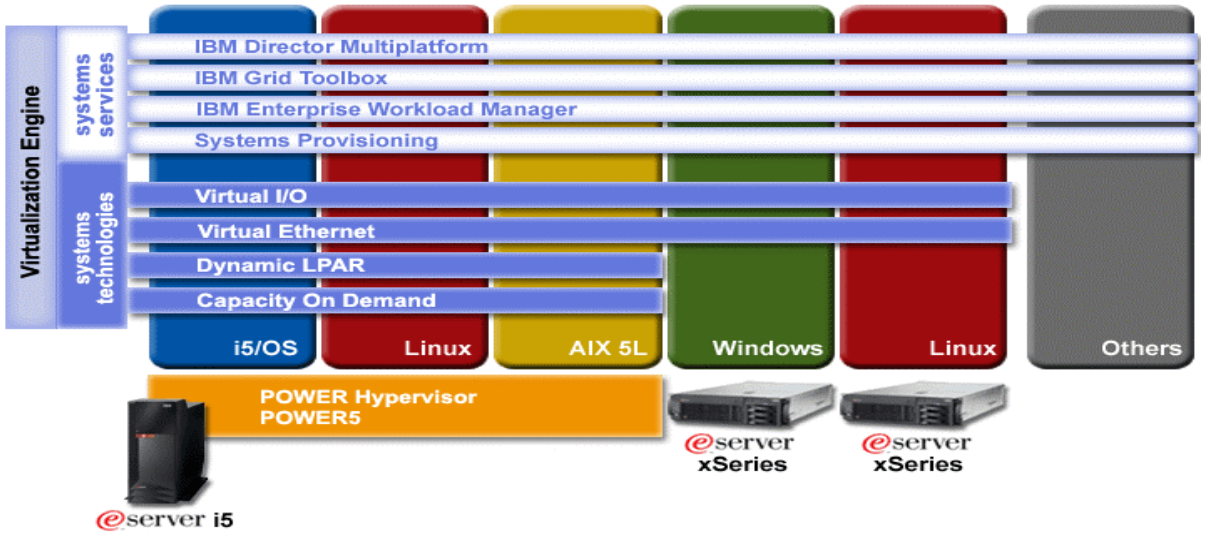
Source: IBM

Transitioning the iServer

When considering how to deploy the eServer i5 within the enterprise data center, it is important to look back to the period when IBM introduced the iSeries. The iSeries came to be in 2000, right after that cataclysmic period in our lives known as *Y2K*. Concerns over the pending crash of every computer in the land had driven enterprises from New York to Los Angeles to replace their servers with systems that could recognize four numbers – **2–0–0–0**. This reduced enterprise spending in 2000 and 2001, not to mention an economic downturn unlike any other in over a decade. Therefore, in addition to replacing mono to 8-way *iServers*, the eServer i5 is in position to replace the AS/400 170 and 7x0. Let's take a look at the eServer i5.

[1] Montecito, a dual-core Itanium processor with larger cache, is scheduled to be available to server vendors in 2005.

Exhibit 2 – IBM Virtualization Engine



Source: IBM

The eServer i5 Solution

Based upon the POWER5 microprocessor, the eServer i5 is an upgrade from the POWER4 architecture used in both the iSeries and the pSeries. The eServer i5, therefore, can take advantage of the synergy of both, much the same way that the Ohio River gains from the energy provided by the Allegheny and Monongahela Rivers. In addition to the performance and reliability of POWER5, the eServer i5 builds upon the *OS/400 V5R2* from the iSeries along with the commodity aspects of the pSeries, i.e., the pricing of memory and disk. The eServer i5 also takes advantage of the *Capacity Upgrade on Demand* features of both iSeries and pSeries, providing eServer i5 data centers with the flexibility to pay for resources when they are used. This is preferred to the cost of installing additional resources in advance, promoting the under-utilization of resources in non-peak periods. In this way, the i5, with both a dual and quad-processor implementation, becomes a mainstream, open systems product for IBM.

The memory price for the low end of the iSeries was $3.15/MB. The price for the i520 is $1.26/MB. This is a reduction of 60%. At the mid-level, the drop from $7.20/MB to $1.34/MB is an 80% reduction. The savings from disk is not as pronounced, but it is still significant with a 35GB 10K RPM device delivering a 30% savings, from $1,960 to $1,359, and the 15K is reduced 20%, from $2,350 to $1,875. IBM adjusted these prices in order to coordinate with the pSeries pricing: common hardware-common pricing is the economic model for eServer i5.

This contributes to the fact that **eServer i5 models improve the price/performance ratio by over 40% when comparing the Express Edition of the i520 to the iSeries 800**. Note that the performance is measured by the same Commercial Processing Workload (CPW) benchmark as the iSeries.

While the eServer i5 platform enables the IT staff to consolidate multiple iServers and AS/400s into a single platform, the POWER Hypervisor provides a base for an easy integration of multiple environments. The Hypervisor, part of the *IBM Virtualization Engine* recently announced and described

Exhibit 3 – i5/OS Feature Highlights

- Integration of WebSphere
- Automated backup for i5/OS hosted Windows, Linux, AIX 5L, and Domino servers
- Cross site mirroring (XSM) and DB2 UDB performance optimization
- Rapid checkpoint save while active
- Activation of real-time file system, virus protection scanning tools

below, supports *i5/OS*, *AIX 5L*, and *Linux* without adding complexity to the data center operation. This enables the eServer i5 to consolidate servers currently running OS/400, UNIX, and Linux applications onto a single platform. The *IBM Director Multiplatform*, an open standards-based heterogeneous management tool, runs this functionality, complementing the iSeries Navigator. I5/OS also includes the integration of *WebSphere* for iSeries into every shipment as a standard component and support for *Lotus 6.5.1*, a single *Domino* server. See Exhibit 3 for i5/OS highlights.

The IBM Virtualization Engine, to become part of all eServers but available first on the i5, enables the IT staff to improve server utilization across multiple workloads by activating unused partitions through dynamic logical partitioning (LPAR) and automatic processor balancing through the implementation of Capacity Upgrade on Demand capabilities. Moreover, virtualization enables the integration of IBM xSeries servers, allowing them to share the storage and backup management plus security profile management of the eServer i5.[2]

IBM eServer i5 model 520

Available in both a deskside and rack-mountable models, the i520 is configurable with either a mono or dual-processor POWER5 CPU. The entry version of the i520 has a CPW of 500. Capable of upgrades to 32 GB of memory and to 19 TB of disk, the 520 dual can deliver up to 6000 CPW. How does this compare to other iServers? A mono-processor iSeries800 enters the performance fray at 300 CPW, with the iSeries810 capable of 1470 CPW and the dual-processor iSeries820 capable of 2350 CPW. This means that the eServer i5 entry has 67% more performance than the comparable entry-level iSeries model and 155% more performance for the dual-processor eServer i5 when compared to a comparable iSeries820. Moreover, you can upgrade your existing iSeries810 and iSeries820 systems to an i520 by exchanging CPUs and installing the i5/OS to replace the OS/400, either V5R1 or V5R2, thus protecting the investment made in the iSeries. The eServer i5 supports existing 10K and 15K disks, allowing them to migrate to i5.

The i520 is available in *Express*, *Value*, *Standard*, and *Enterprise Editions*. Using Express pricing, an i520 at 500 CPW costs $11,500, 35% less than a comparable i800 Value at $18,000. An i520 at $14,500 replaces an iSeries800 Standard at $28,000, a reduction of 48%. It can replace the Central Electronics Complex (CEC) of an i810 purchased in 2003 for $78K with an i520 CEC priced at $48K, a 38% savings, with about the same CPW performance, assuming Enterprise Edition pricing.

IBM eServer i5 model 570

Available in a rack-mountable drawer, the i570 is configurable as a mono, dual, or quad-processor POWER5 CPU, with Capacity on Demand options. The data center can divide each processor into 10 Logical Partitions (LPARs). The entry version of the i570 has a CPW of 3300. Upgradeable to 64 GB of memory and to 39 TB of disk, the i570 quad-processor can deliver up to 11700 CPW. IBM provides an upgrade path to the i570 from the iSeries810/820/825/830, up to the 8-way iSeries870, which has a rating of 11,500. This means that a 4-way eServer i5 outperforms an 8-way iSeries870.

Using the Enterprise Edition pricing for the eServer i5 reveals a similar story. A 3-way iSeries825 rated at 3300 CPW has a CEC cost of $300K, about the same as a mono-processor i570. An iSeries870 with five processors has a CEC cost of $765,000 for 7700 CPW. A comparable i570 with two processors has a CEC cost of $498,000 for 6350 CPW. This results in a price performance of $99/CPW for the iSeries870 and $78/CPW for the i570, a 21% reduction in favor of the eServer i5 family.

Conclusion

The eServer i5, taking advantage of economies of scale from the pSeries and iSeries, is now the most powerful and flexible OS400-compatible server available. With the ability to run multiple operating environments simultaneously and share literally tens of thousands of mission-critical

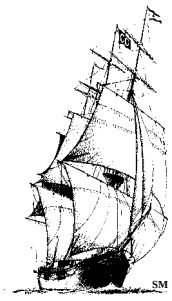
[2] Look for a forthcoming Clipper bulletin on the IBM Virtualization Engine.

applications, eServer i5 servers can dynamically adjust to changing requirements. **This is exactly what the forward-looking enterprise requires to simplify the IT infrastructure, reduce the total cost of ownership, and improve productivity in today's increasingly on-demand world.**

The i5/OS brings value through the implementation of new levels of virtualization to the data center's installation of open systems. The IT staff gains through:

- The reduction of costs by increasing resource utilization;
- The capability to rapidly provision new servers;
- The freedom to redeploy staff to manage your enterprise, not your infrastructure;
- The consolidation of storage and simplification of backup;
- The simplification of server management and operations;
- The capability to integrate the enterprise's x86 servers more securely;

Today may be the right time to join the POWER train and simplify your data center with eServer i5.



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

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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.

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