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A New Mainframe for the Low End – IBM's Very Special *z800-0E1*

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Management Summary

Enterprises with a small-capacity IBM or PCM mainframe have a love/hate relationship with IBM. They love to run applications reliably on their *S/390* (or else they would have switched by now) but hate their position as the low man on the totem pole of mainframe customers. IBM seems to provide solutions for everyone else before them. This is understandable. IBM's mainframe revenues are tied to the capacity installed, and the thousands of small mainframe owners do not add up to a lot of capacity, even in the aggregate. But being low-man remains unpopular with the enterprises in that position. If this resonates with you, **feel neglected no longer; IBM has something special for you**.

Capitalizing on the popularity of its latest *zSeries* server, the *z800*, IBM is offering a further scaled-down model, the *z800 0E1*. While this model runs your *OS/390*, *VM/ESA*, *VS/ESA* and other traditional mainframe environments at one-fifth of the processing capacity of its uniprocessor *z800* sibling, *Model 001*, it provides all the functionality available in any other zSeries model. More significantly, the 0E1 includes a second, ungoverned, processor that fully enables Linux applications via the *Integrated Facility for Linux (IFL)*. **Is this another ploy by IBM to get you to go where you hadn't planned or don't want to go? Or, is this a really good deal? The answer: a bit of both.** (What else did you expect?)

zSeries has been one of the few shining examples of continuing capacity growth in IBM's eServer business. This is not by accident. There are a number of reasons, but growth of new applications (which do not include *CICS, IMS, COBOL*, etc.) accounts for about 70% of the new MIPS shipped. Many zSeries factors drive this reality:

- Software licensing terms and pricing are friendly to new applications.
- *z/VM* is an easy consolidator of many Linux workloads.
- Reduced entry-level software licensing applies even for traditional mainframe workloads.
- A right-sized zSeries platform is available for just about everybody (except for you).

And now the 0E1 could be IBM's answer for you, especially if you have turned to Linux in a big way. If your workloads run on lots of one- and two-way servers, if you are about to deploy/redeploy your server applications on Linux, or **if you are committed to running your mainframe applications and Linux workloads for the lowest TCO, the 0E1 is probably the best way to proceed.** IBM Global Finance also has some special plans that allow you to consolidate on the 0E1 with a single financial package. Read on to find out more.

No Longer a Need to Wander in the Desert

Many of you may have felt that you were exiled into the desert, unable to reach the Promised Land of milk and honey – the zSeries. Many of you have been watching as the clock counts down to the end of support for your current operating environments. Yes, you could have moved to one of the previously announced *z800* platforms, but the scale was too large and the economics did not make any sense for the size of your workload. And, now you've got other problems to worry about, like the proliferation of applications on too many small servers. **With the *zSeries Model 800/0E1*, which is available immediately, you now have a broader solution that is also scaled to your workload needs.**

z800 Extends Consolidation Opportunity

As enterprises accelerate their growth while continuing to focus on reducing expenses, they place greater dependence on highly reliable and cost efficient information technology solutions. **Because the cost of managing IT infrastructure is largely a personnel cost, this usually equates to more centralized server platforms providing centralized management.**

Mid-sized enterprises troubled by the proliferation of disparate UNIX operating systems and Microsoft Windows server environments struggle today with the need for greater consolidation and more efficient resource management. Enterprises that also have investments in stable but essential mainframe applications face challenges that are even more complex.

IBM's *zSeries Model 800 (z800)* fits the needs of these enterprises like a glove. The addition of the *Model 0E1* to that series offers a full-function and cost-efficient solution for integrating traditional mainframe workloads with Linux onto a single server platform.

Combining the traditional zSeries operating environments with the *Linux* environment in a single server reduces operational problems and expenses related to heterogeneous operating systems, servers, support personnel, and procedures. This assures a lower cost of ownership for the enterprise. Several scenarios illustrate this potential with the *Model 0E1*:

- An enterprise developing a new application uses the Model 0E1 as a development platform and, subsequently, as the execution environment.

- An enterprise with several Microsoft Windows and/or Unix applications distributed on multiple (many) small servers consolidates the workloads on the *Model 0E1*.

- New Linux workloads, developed on distributed servers, are placed in production using the *Model 0E1* as a single server environment.

- An enterprise finds that it has excess capacity with its zSeries 0A1 model and chooses to downsize to the *Model 0E1*, thus reducing its mainframe software licensing charges.

- An enterprise is left with a handful of small but critical *S/390* workloads and consolidates them onto the Model 0E1.

No enterprise server has the continuous history of meeting critical enterprise application requirements as does the zSeries and its predecessors. **Within the zSeries, no server is better positioned to respond to critical entry-level enterprise requirements than is the Model 0E1.**

Linux on zSeries Enables Efficient Application Portability

The key to achieving a lower cost of ownership with the Model 0E1 is integrating Linux workloads. Since 2000, Linux has gained increasing visibility and credibility as a development and as an execution environment.

IBM launched its Linux focus in March 1999. By the end of 2000, IBM positioned Linux as the key to its cross platform application enablement strategy. Special focus was placed on maintaining the open nature of Linux development and support. Activity continues to center around shared development with open standards groups.

Once a data center embraces Linux as

its open environment, porting non-complex applications (such as file, print, and Web serving, or e-mail) usually within a few days. Subsequent portability among platforms for workload balancing, distributed operations, etc., becomes a trivial matter.

Linux-based applications provided by Independent Software Vendors (ISVs) operate well on the Model 0E1 and cost substantially less than on models with greater capacities. IBM continues to work closely with third-party vendors to assure the broadest support of applications, tools, and middleware products.

Linux Under z/VM Assures Efficient Resource Use

zSeries servers offer several options for running Linux: natively, in separate logical partitions (LPARs), or as guests under *z/VM*. Each option offers advantages for specific circumstances.

Native Mode

Running Linux natively means that only one Linux system can run at a time. An advantage is that that Linux has full access to the resources of the entire system. The only software required is the Linux operating system and the application.

The downside of this configuration is that there is no operating system to enable communication between Linux and the server hardware before Linux is booted. Communication to the system is only enabled through a hardware console and debugging occurs in the same manner. This is highly complex and requires system administration skills.

This configuration is not recommended for most application execution environments. It can support a testing environment.

Logical Partitions (LPARs)

A zSeries server is divisible into 15 logical partitions, each with its own allocation of memory and dedicated or shared resources, including channels for I/O operations. Each LPAR operates independently of another.

Thus a Linux image can operate in each of the 15 partitions with no additional software requirements. Unfortunately, the need remains to manage and debug the config-

uration from a hardware console. This choice also is only recommended for testing environments.

Linux as a z/VM Guest

The z/VM operating system provides an environment in which hundreds to thousands of guests, each potentially a Linux environment, operate on a single zSeries server. In this configuration, a broad assortment of tools and utilities are available to assist in managing and debugging the environment. Features that z/VM offers include:

- Resources, including processors[1], memory, storage, and network adapters, are sharable among multiple Linux images.
- New guests are added quickly without requiring dedicated resources
- Extremely high-speed virtual networks connect guests and connect them to z/VM's TCP/IP stack.
- Storage management and backup are centralized.
- Real devices[2] are added to or removed from the configuration without disturbing Linux guests.
- A rich debug and test environment creates images that duplicate production systems without requiring additional physical resources.
- Comprehensive workload monitoring and control functions exist.

These advantages, all available on the Model 0E1, have the potential to significantly reduce staffing requirements and hardware management costs. While running this environment is a complex task that requires qualified, knowledgeable staff to implement, IBM has substantially reduced the complexity. Involvement with the z/VM software is limited to supporting a guest environment via the *Hipervisor*.[3]

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[1] As a Model 0E1 standard feature, only one processor is dedicated to Linux. Two additional IFL engines (for a total of three) can be enabled, plus the 40-MIPS traditional engine.

[2] Such as additional storage.

[3] IBM offers a class, "VM Basics for Linux" (learning services code ZV050) for first time users.

Once the system is installed and configured, deployment of new virtual servers is much less complicated. The network administrator remains responsible for managing IP addresses and network architectures; the Linux system administrator is responsible for configuring individual servers.

Linux under z/VM on the zSeries Model 0E1 is a highly efficient way to consolidate workloads on a single server. In many cases, UNIX or Windows NT servers show average utilization of less than 15%. Consolidating these workloads to the Model 0E1 under Linux with its resource-sharing ability produces substantial benefits in lower costs and higher reliability.

Conclusion

The growing popularity of the z800 Series is not accidental. IBM has designed and delivered a highly flexible, general-purpose server capable of scaling vertically through nine models to a large 4-way multiprocessor. Now with the Model 0E1, value delivered by the zSeries is available to an even wider audience.

As an enterprise with stable or slowly growing legacy applications, investing in an entry-level zSeries server offers a highly efficient solution for today's application needs. Equally important, it provides your existing and emerging workloads with an environment for well-managed growth into the future.

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