

## The Enterprise Linux Server

### – The Best Choice for In-House Linux Clouds

Most IT executives running Linux applications have the perception that their best option is to execute them either standalone or virtualized on x86 servers. Conversely, myths surrounding Unix and mainframe enterprise servers have misled business and IT executives into believing these high-end servers are expensive and outdated. Together these two perceptions have led to higher data center costs and sub-optimization for mid-market and larger companies. RFG finds that a better, more economical choice than x86 servers would be to move or deploy Linux applications onto an IBM Enterprise Linux Server, a specialized System z server. Such a move could cut the total cost of ownership (TCO) for the Linux applications by up to 50 percent or more, especially if the applications are running on standalone servers. Additionally, the Enterprise Linux Server return on investment (ROI) is quicker and total cost of acquisition (TCA) is less than that of x86 Linux solutions for companies having more than 50 Linux production and support servers.

### The Business Environment and IT Impacts

2014 may be a growth year for some countries but most will experience a number of global economic headwinds that will mean slow or no growth. This will cause IT budgets to remain constrained and make it difficult for IT executives to keep current in technology, meet new business demands, and develop the skills necessary to satisfy corporate requirements. Nonetheless, business executives will push IT to deliver more – more innovation, additional applications, enhancements, and advanced analytics and big data capabilities.

The best way for IT executives to satisfy the business requirements is through business process improvements and cutting operations expenditures through data center transformation. In simpler terms this means less complexity, more agility, greater productivity and higher utilization of resources – all driving down IT operational costs.

One of the major inhibitors to this transformation is the management complexity associated with a growing proliferation of x86 distributed systems running isolated workloads. Recent surveys found 81 percent of respondents primarily evaluate their hardware selection based on the cost of acquisition and more than half of the respondents have made some progress on virtualizing their infrastructure.<sup>1</sup> Thus, for every new application need or existing application expansion the odds are a new x86 server will be acquired. The unvirtualized or minimally-virtualized servers operate at utilization levels of less than 20 percent – most



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<sup>1</sup> ZDNet's "IT Priorities 2012 – United States" and "Server Virtualization Predictions - Driving Value Above And Beyond The Hypervisor", Forrester 2013

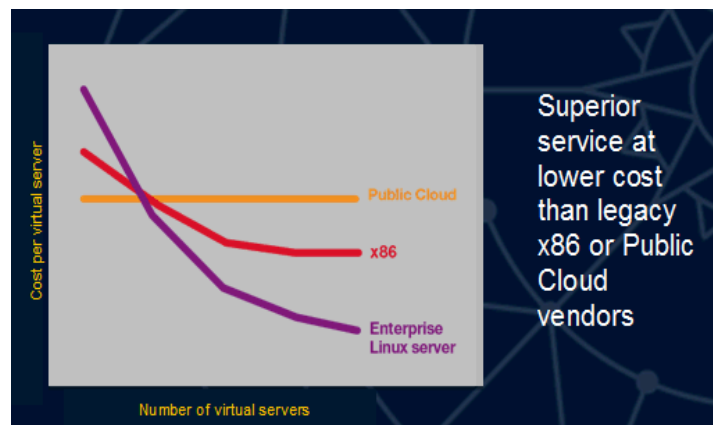
at less than 10 percent – while the average virtualized servers run four to six VMs per physical server and operate at less than 30 percent utilization. Additionally, since each server must have its own dedicated data and storage, records are duplicated many times over. In fact, many companies have seven to 50 copies of databases in production with added duplicates for archiving, backup, development and test.

This myopic approach to system solutions needs to stop if business and IT executives want to transform their operations, create a cloud-like environment, and reduce operations costs to less than half of the IT budget. There is an architectural solution that will let IT enable the business to pursue its needs without waiting for IT to provision, change, or decommission systems and it can be done at a lower cost – both from a total acquisition cost (TCA) and total cost of ownership (TCO) basis. In effect, it will bend the curve so that IT can truly do more with less.

### **The IBM Enterprise Linux Server**

The IBM Enterprise Linux Server is a low-cost scale-up specialized enterprise server designed exclusively to run Linux applications. IBM sells it as a standalone Linux server. The entry level Enterprise Linux Server can consolidate up to 40 virtual servers per core and up to 520 virtual servers in a single footprint for as low as \$1.20 per day per virtual server. This economically priced Linux server solution includes System z hardware, z/VM virtualization, IBM Wave for z/VM virtualization management software, and three years of maintenance and support. It can support Red Hat Enterprise Linux (RHEL), SUSE Linux Enterprise Server (SLES) and OpenStack cloud. There are more than 3,000 Linux ISV applications available and supported on the Enterprise Linux Server. Each server can have up to 13 cores and 496 GB of memory and can be easily upgraded to accommodate more cores or to migrate to the next generation.

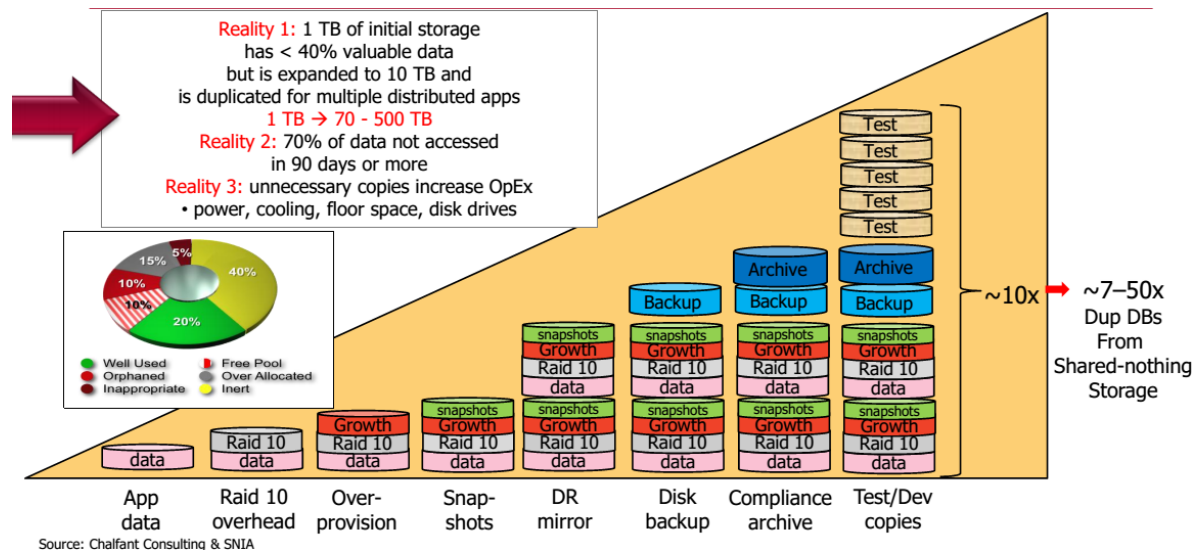
The advantages of this architecture are the scale-up design, which allows for shared components (processor, memory, networks, etc.) and incremental cost-per-workload savings as workloads increase. No over-provisioning is required. On the other hand, traditional scale-out x86 environments do not offer any cost-per-workload savings as the workloads grow. (See adjacent chart.) Since the Enterprise Linux Server processors are designed to run Linux applications, there are no code rewrites required during migration and from an end-user vantage point, the appearance remains unchanged.



Source: IBM

Furthermore, there is tremendous savings on the storage side that most IT executives are unaware of and do not account for in their cost/benefit analyses. Scale-out x86 servers utilize a

shared-nothing data storage architecture, which means that no two applications running concurrently can access the same file or database (unless specialized data-sharing software offered by third parties is purchased and employed). This can result in multiple copies of the same database. As can be seen in the chart below one terabyte (TB) of production data can actually mean 10 TBs of data is created and stored. Then when this is multiplied by each production copy required, one can end up with a minimum of 60 – 70 TBs of used data created. On top of this one has to add in the additional allocation space and unused data reserved for growth and performance purposes. This gets to be quite expensive.



The IBM Enterprise Linux Server significantly simplifies this problem by employing the unique System z shared-everything data storage architecture. That means that only a single copy of production data need be created and can be used by all applications concurrently. The savings in storage acquisition and operations costs can be quite significant, and in some cases far exceeding the costs of an Enterprise Linux Server. It also simplifies disaster recover operations and gets users back on line far faster.

Another hidden advantage of the Enterprise Linux Server is the way it is packaged. IBM treats this server like any other System z server and, therefore, it is upgradable. Adding new cores or upgrading to a new generation of servers is treated as an upgrade (not a purchase of new equipment) and either can be accomplished over a single weekend. From the CFO's viewpoint the life cycle of the server is extended, which maps well to the way companies like to account for hardware purchases, and makes the payback for Enterprise Linux Server processors that much more attractive. On the other hand, almost all x86 servers do not have that capability and a move to the next generation means acquisition of a new server and retirement (or reallocation) of the old. It can also mean up to six months of provisioning and deployment time and resource costs.

The best workloads to put onto an Enterprise Linux Server are applications requiring rapid disaster recovery, business-critical ISV applications, business connectors, data services, development of WebSphere and Java applications, email and collaboration applications, network infrastructure, virtualization and security services, and Web servers and Web application servers. Enterprise Linux Server processors are also excellent for applications whose processor and memory utilization vary significantly throughout the day.

### **IBM Wave for z/VM Benefits**

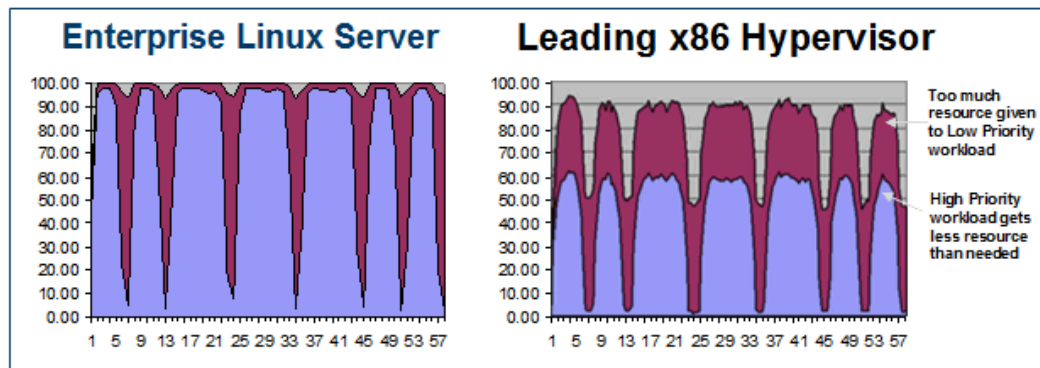
One of the truly great additions to the Enterprise Linux Server software set is IBM's new IBM Wave for z/VM. IBM Wave is a virtualization management tool for administrators that could reduce the administration and management of IBM z/VM and Linux virtual servers up to 85 to 95 percent. Its intuitive graphical user interface makes the Enterprise Linux Server look and feel like typical x86 systems running VMware. No more strange System z scripts or need for green screens or high-priced administrator costs. Moreover, it integrates seamlessly with z/VM and Linux environments to help administrators view, organize and manage resources in an optimized and standardized manner. Administrators can provision and decommission Linux servers, view network topologies, and act upon other resources by pointing and clicking. IBM Wave can clone a single clone on the same z/VM or clone cross-system to another z/VM; it also allows users to provision multiple clones (into the hundreds) at a single time. The cloning of up to five servers can take three minutes instead of one hour manually the old way on an Enterprise Linux Server and potentially multiple hours on an x86 server. It can do live guest relocation as well. An additional nice feature is the IBM Wave dashboard, which will display the progress of all the tasks.

There is no software restriction to the maximum number of virtual servers supported by IBM Wave. According to IBM one customer has thousands of geographically-dispersed virtual servers under a single instance of IBM Wave. The administration of the entire z/VM ecosystem was reduced from a staff of six to a single z/VM administrator; the staff of 11 Linux administrators remained unchanged. Nonetheless, it was a 30 percent reduction in headcount – easily \$500,000 - \$750,000 in annual savings. In large implementations personnel savings alone from the Enterprise Linux Server and IBM Wave could exceed the cost of the servers. Furthermore, with IBM Wave automatic installation and Auto-Detect technology, IT shops can have the product installed, up and running within the same day and a VMware or any x86 hypervisor administrator can be trained to support the IBM Wave environment in less than two days.

## Enterprise Linux Server Benefits

IT organizations that migrate Linux applications to Enterprise Linux Server environments will achieve savings at the time of acquisition and in each year of operation. Companies having dozens of Linux applications or those with wild variations in processor and memory utilization can acquire and install an Enterprise Linux Server ecosystem for less than the equivalent x86 ecosystem costs, even if they are virtualized. From a total cost of ownership (TCO) standpoint, RFG expects a mid-market company or larger with a reasonable set of Linux applications would be able to cut their TCO costs by 50 percent or more. The savings will be across the board – hardware warranty and maintenance, software licenses and maintenance, financing, personnel, power and facilities costs.

Utilization and productivity will be much higher with an IBM Enterprise Linux Server than with standalone or virtualized x86 servers. The System z architecture used by the Enterprise Linux Server enables resources to be shared amongst applications, which allows for far greater utilization (up to 100 percent) and better usage of resources. (See below charts.) Additionally, resources can be dynamically added or moved without disrupting operations. The Enterprise Linux Server's hardware infrastructure is designed to operate with the highest levels of availability (99.99 percent), price/performance, reliability, scalability and security (EAL 5 certification). The unique benefits of the architecture allow users to run production, development/test, and quality assurance applications on the same server without fear of interference, security exposures or impact on performance.



## Summary

Existing misconceptions around server technology have misled business and IT executives into believing System z solutions are expensive and outdated and Intel servers running VMware are the least-cost processor environments. These falsehoods have resulted in higher data center costs and sub-optimization for mid-market and larger companies. The IBM Enterprise Linux Server is an effective in-house Linux cloud server platform that counters these myths and can provide IT executives with a Linux solution that will help companies contain costs, become more competitive, and assist with a transformation to a least-cost consumption-based usage model.

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