IDC
Analyze the Future

WHITE PAPER

Linux in the Mainstream: Highlighting Customers Running Their Business on Red Hat Enterprise Linux

Sponsored by: Red Hat

Al Gillen

January 2013

IDC OPINION

Linux continues to be the fastest-growing operating system when measured on the basis of revenue growth and subscription growth. It is apparent that customers are finding value with Linux deployments. However, that success is not just with infrastructure server deployments, as was the case in the early days of Linux in the enterprise. Instead, Linux has become successful in capturing a full spectrum of workload types that historically have run on a variety of servers, including high-end applications previously hosted on non-x86 servers.

- Linux has been particularly successful as a rehosting platform for many business-critical Unix workloads over the past few years. Real-world examples are plentiful today for organizations that have made a broad commitment to Linux and are staking their most important business operations on Linux solutions.

- Consider the University of Florida, which crisply illustrates how customers are moving critical commercial applications from Unix to Linux and are reaping cost savings without any loss in supportability or ability to meet corporate needs.

- High-end commercial applications, including brand names such as PeopleSoft, Hyperion, Cognos, and Oracle, are hosted on the University of Florida's Linux servers and support operations for a 100-person administrative staff and a 20,000-person faculty that serve some 50,000 students. Historically, the university was a Unix shop, but it was attracted to the cost benefits of Linux and today employs a virtualization-first, Linux-first deployment strategy.

- One of the important future opportunities for a software company such as Red Hat is securing a role as a software supplier to service providers. Finnish service provider Ixonos selected Linux as the foundation for its public cloud. Ixonos chose Red Hat Enterprise Linux (RHEL) as the infrastructure solution for many workload types, particularly where customers are not bringing a legacy application to the environment. The justification: Red Hat provides a full support life cycle, allowing Ixonos to focus on value-add for customers.

Global Headquarters: 5 Speen Street Framingham, MA 01701 USA P.508.872.8200 F.508.935.4015 www.idc.com

IN THIS WHITE PAPER

This IDC White Paper presents three case studies of customers that are using Linux for large deployment, business-critical applications. The case studies profile the University of Florida, which is supporting its large-scale, commercial mission-critical applications on Red Hat Enterprise Linux; Finnish service provider Ixonos, which sells a standardized Web platform layer built on top of RHEL; and a large university in the Northeast, which uses RHEL as the foundation for a community-developed line-of-business application that it is aggressively deploying.

SITUATION OVERVIEW

Linux has already established a solid position in the industry and can be expected to expand its footprint within all workload types. The growth of deployments supporting business-critical applications will continue well into the future, with Linux being one of two volume solutions that will power the 3rd platform of computing — the next-generation platform that will integrate social business and broadband wireless-connected mobile access devices with big data and analytics over a cloud-based server environment. The 3rd platform follows the widely utilized 2nd platform, which is characterized by distributed servers accessed by PCs over LAN connections.

This document contains three case studies: Two case studies highlight universities that took the common approach of using Red Hat Enterprise Linux for their business workloads but diverged dramatically in their selection of the applications themselves. One university used commercial application software, while the other used open source application software. These two unique approaches demonstrate the versatility and the broad range of choices available to Linux users today. The third case study highlights an exciting new opportunity for vendors today: the emerging service provider market that delivers platform-as-a-service (PaaS) resources to business customers.

CASE STUDY: UNIVERSITY OF FLORIDA

Case Study Snapshot

- **Industry:** Higher education
- **Objective:** Consolidate all Unix workloads on Linux; deploy business-critical commercial applications on Red Hat Enterprise Linux
- **Current status:** All Unix servers have been retired and decommissioned; all existing servers are on Linux and Windows. The university depends on mission-critical applications running on Linux for day-to-day operations.
- **Red Hat Enterprise Linux usage:** The university is a heavy user of Red Hat Enterprise Linux, with virtually all Linux being Red Hat Enterprise Linux 5 and Red Hat Enterprise Linux 6. About 50% of total server instances are Linux, with the balance being Windows.

Red Hat as the Consolidation Platform for Commercial Business Applications

The University of Florida, like most large universities, has a distributed IT organization responsible for delivering various IT services to faculty and staff, administrators, and tens of thousands of students. Chris Easley, director of Enterprise Computing Infrastructure, runs one of the IT groups, a small team of 10 professionals charged with supporting some of the most critical enterprise applications.

The team may be small, but the mission is big. The University of Florida's administrative system and its data warehouse, as well as a portal that ties those resources together, are under Easley's charge. The university uses PeopleSoft applications as the management backbone for its day-to-day operations. Through the course of a semester, those systems are used by an administrative staff of 100, a faculty of 20,000, and a student body that numbers around 50,000. Easley and his team support the servers, storage, virtualization layers, databases, and applications themselves. In other words, top-to-bottom responsibility for these critical administrative systems belongs to his small group.

Easley describes the university as being a leading-edge — but not a bleeding-edge — adopter of new technology. VMware has been in use for a long time and has been leveraged heavily over the past five years. During the past year, the focus has been specifically on virtualizing the tier 1 applications, including PeopleSoft, Hyperion, and Cognos solutions. By the end of the current fiscal year, Easley expects the environment to be 100% virtualized, including the university's Oracle RAC and Oracle data warehouse solutions.

The university has been deploying this latest round of virtualized workloads aboard Cisco UCS servers, displacing older IBM BladeCenter systems that had been the last-generation hardware solution. Currently, 6 Cisco UCS servers are supporting 400 virtual machines, and just over 20 IBM BladeCenter servers are supporting the soon-to-be-migrated databases, which at the moment remain on physical hardware.

Operating System Consolidation

From an operating system perspective, the University of Florida has been on a steady march toward an all-x86 infrastructure, and in the past six months, it eliminated the final vestiges of its former Unix infrastructure when the last IBM AIX servers were migrated to Red Hat.

Says Easley, "We prefer Linux, [and] even though we have a virtualization-first strategy, we also have a Linux-first strategy." The university signed an enterprise licensing agreement (ELA) with Red Hat, which makes it practical to deploy Red Hat wherever possible. The reality, though, is that deployment decisions are made on an application-by-application basis, driven by the level of product support for applications running on Linux or Windows. In some cases, particularly with older Cognos version 7/8 products that are still in service at the University of Florida, requirements force a decision to use Windows. However, when the application does not force a decision, Red Hat is the first choice for Easley's team. At this point, the physical and virtual servers under Easley's responsibility are split just about evenly between Red Hat Enterprise Linux and Windows.

The decentralized nature of the university leads to decentralized operating system decisions, too. Where Easley is highly concerned about using an enterprise-grade distribution that has deep support from business application ISVs, other departments are less focused on the benefit of Red Hat Enterprise Linux. As a result, Red Hat Enterprise Linux is not widely used in other departments.

However, the ELA is changing that perspective. Easley's team is working to share its experience with RHEL with other teams at the university, and its advocacy is generating movement. For example, the university's high-performance computing center recently migrated a 500-node cluster to Red Hat Enterprise Linux, increasing the size of the cluster to 700 nodes in parallel with that migration.

Given the leading-edge deployment perspective, Easley's view is that Red Hat Enterprise Linux has demonstrated its maturity, and that is justification enough to deflect other Linux distribution options. Given that the University of Florida is a big Oracle customer, the university — not surprisingly — has been pitched by Oracle sales reps to consider Oracle Linux. Notes Easley, "It is in our face daily for the databases, and Oracle will tell you that their operating system is the best for their databases. But we run a lot of other things besides Oracle. Right now, for us, Red Hat is the clear choice; there is no clear, compelling case for us to get off Red Hat."

Cloud Computing

The University of Florida remains committed to VMware, but it has acquired a number of Red Hat Enterprise Virtualization (RHEV) subscriptions for educational and testing purposes. In the meantime, a sister group has been building out a platform-as-a-service (PaaS) and an infrastructure-as-a-service (IaaS) offering, built on Red Hat Enterprise Linux, that other parts of the university consume. Says Easley of the other team, "They do a really good job [and] continue to drive the price down for our offerings. It is super competitive even compared to an Amazon. And they are continuing to drive in feature function."

Will Easley eventually move his compute resources to this emerging private cloud? "I would love to," he says. "Right now, we have been merging our server infrastructure. Next stop is merging our server pools and our server areas. That is the strategic plan." Easley notes that long term, it does not make sense to have two separate, disparate infrastructures.

Running Mission-Critical Apps on Red Hat Enterprise Linux

According to Easley, the goal for his team is to excel in delivering application services that are highly available and trustworthy and meet the business' needs. He notes, "We are a little risk averse." As a result, his team works closely with ISV partners and follows their direction. Says Easley, the last thing the university wants is to potentially have an issue and not have the vendor's support.

"From my perspective, Red Hat Enterprise Linux is a very strong offering, it is well baked, [and] it works great for us," he says. "It is one of the most widely supported platforms out there. We have vendor support from other companies that falls short. We don't want to

extend that into the operating system area. Red Hat always knocks it out of the park for us [and] is an extremely good partner. They are willing to work on an approach that fits you as a customer. You don't get that with some of the larger vendors."

Case Study Takeaways

- **Best practices**
  - Standardizing on a single Linux distribution
  - Working closely with and taking guidance from ISV partners for business-critical applications
  - Taking a leading-edge, but not a bleeding-edge approach to business-critical applications
- **Opportunities**
  - Accelerate standardization of Linux usage across the university
  - Leverage internal PaaS and IaaS offerings that are available today

CASE STUDY: SERVICE PROVIDER IXONOS

Case Study Snapshot

- **Industry:** Service provider
- **Objective:** Standardize operating system layer in a public cloud infrastructure
- **Current status:** Ixonos has achieved Red Hat Cloud Certification. Numerous customers are currently deployed on PaaS layers running business-critical applications.
- **Red Hat Enterprise Linux usage:** The majority of Linux instances (60–65%) are Red Hat Enterprise Linux; the balance of Linux is primarily Cent OS. Windows is used only for a small number of specific customers.

Leading the Way with a Red Hat Cloud

Tangible examples of true platform-as-a-service (PaaS) cloud computing being used by end-user organizations are in short supply today, despite the excitement around cloud computing. The untold part of the story is that most companies that brand themselves as cloud providers (better described as service providers) continue to generate more of their revenue through colocation and private hosting than they do with any form of public cloud hosting. So when a service provider steps forward with a concrete example of a true multitenant public cloud computing solution, it is worth taking note.

Such is the case with Finnish service provider Ixonos, a company that sells a standardized Web platform layer built on Linux, offering services such as a LAMP stack to a variety of customers that deploy their business applications on top of Ixonos' PaaS solution. Ixonos is on the leading edge of the market, where its PaaS hosting business already constitutes one-third of the company's overall revenue and, more importantly, over 50% of the company's growth.

To achieve this level of success, the company has two tiers of investment that allow it to deliver a cost-effective, scalable service to customers. The foundation is an elastic cloud computing infrastructure, and on top of that is a Linux and an infrastructure solution stack that delivers a full PaaS implementation, built using Red Hat Enterprise Linux. The company says Linux accounts for about 99% of the cloud solution, while Windows, which the organization hosts to help meet some customer-specific requirements, makes up the remainder.

Online Applications

Ixonos' primary business focus is on supporting online and mobile applications for companies that offer those applications to end customers. Teppo Kuisma, vice president of Online Solutions at Ixonos, says the main base of both existing and new business is customer-facing, online services. "We have many media companies, we have insurance companies, cities, and we have mobile operators — companies like Nokia," he says.

"The nominating factor for these clients is they are building services for global scale, and they want to have the flexibility of what we can provide to them for a managed service and DevOps approach," adds Kuisma. "What we don't do is we don't host enterprise IT. We have no email servers [or] HR [or] ERP systems in our operations. We could do that, but we have wanted to stick with online and customer-facing applications. There are certain time-to-market and elasticity [requirements], and our cloud is geared for that." One example of a critical application being hosted is the Nokia store. Kuisma says the agility of Ixonos is a key dimension for many of the company's customers.

Red Hat for Cloud Services

The company has used Linux for over 10 years in its hosting and service provider business and in the past had used a mix of Linux distributions. However, Ixonos made a strategic decision to use Red Hat Enterprise Linux as the basis for its PaaS operations. It joined the Red Hat Certified Cloud Provider Program and now is deploying primarily Red Hat Enterprise Linux.

Over the past three years, Red Hat Enterprise Linux penetration has grown to 60% of the company's servers. Kuisma notes, "Currently, we very [rarely] get into the system where we choose, 'Shall we do this with Red Hat [Enterprise] Linux or something else?' As a Red Hat Certified Cloud Provider, our cloud is built on top of Red Hat. Of course, one of the reasons is for support, maintenance, life-cycle management. We prefer to run a Red Hat stack."

As part of its participation in the Red Hat service provider program, the company is also beginning to deploy Red Hat Enterprise Virtualization. Ixonos is currently a VMware shop, but Kuisma expects the infrastructure to transition over the next three to five years, as Red Hat's solutions become Ixonos' primary virtualization engine.

Kuisma says that Linux has proven itself in the company's PaaS cloud. "Scalability is not a consideration that would make us look at something else," he explains. Customers use the Ixonos cloud for databases as well as application workloads. In fact, the Red Hat Enterprise Linux layer has become a given. The concerns during deployment of a new application are not related to Linux; instead the focus is, as it should be in a PaaS environment, on ensuring the application deployed on the app server works as expected.

Red Hat Enterprise Linux for the Long Haul

Ixonos is finding that its investment in Red Hat Enterprise Linux is delivering value to its service provider operations. Says Kuisma, "We don't see any reason that we would be switching to some other Linux distribution for our operations." While he recognizes it is difficult to project how the PaaS business will evolve 5 to 10 years out, he says, "Our experience with Red Hat over the past two years has been very positive."

Case Study Takeaways

- **Best practices**
  - Increasingly standardizing on a single Linux distribution
  - Participating in the Red Hat Certified Cloud Provider Program
  - Focusing on delivering a reliable and PaaS product
- **Opportunities**
  - Drive Red Hat Enterprise Linux standardization closer to 100%
  - Expand to other PaaS services

CASE STUDY: LARGE NORTHEASTERN PUBLIC EDUCATION INSTITUTION

Case Study Snapshot

- **Industry:** Higher education
- **Objective:** Deliver open source application solutions using Red Hat Enterprise Linux
- **Current status:** ERP applications are widely deployed and heavily utilized by university staff and students.
- **Red Hat Enterprise Linux usage:** Red Hat Enterprise Linux is used as the foundation for a large Kuali implementation.

Following the Lead of the Community

Open source software has proven itself in infrastructure and application deployment layers — as operating systems, databases, middleware, Web application servers, and so on. Some bold open source proponents had projected that open source could compete at any level of the software stack. While open source software has been most successful at lower levels of the software environment, one interesting example of an application environment, called Kuali, is gaining traction and driving Red Hat Enterprise Linux deployments.

The project itself has origins that date back to the 2000 time frame, when Indiana University began searching for a replacement financial management system. Indiana University's work evolved into what today is known as the Kuali Foundation (**www.kuali.org**), which was formally launched in 2004. The Kuali Foundation describes itself as open source software for higher education, built by higher education. The Kuali stack includes middleware, business continuity planning, financial management, student management, and people management modules.

The Red Hat Connection

What does Kuali have to do with Red Hat? The simple answer is that the Kuali community has standardized on Red Hat Enterprise Linux as its base platform. IDC interviewed a large public higher education institution in the Northeast about its use of Red Hat Enterprise Linux, and the connection was clear: The university has joined the Kuali Foundation and is heavily deploying Kuali solutions in its datacenter, and it has begun a broad rollout of Red Hat Enterprise Linux to support this solution set.

The university, which is prohibited by state regulations from being named, is well into its Red Hat Enterprise Linux implementation. Historically, the university used a mix of servers including Solaris and AIX Unix servers, Windows and Linux servers, as well as an IBM z10 mainframe that also supports Linux on an IFL. However, today the university is expanding its use of Linux and is working toward standardizing on Red Hat at the same time that it is focusing on decommissioning its Solaris servers.

The university's Linux and virtualization architect, who oversees a staff of nine employees, is spearheading the infrastructure layers of this solution. He and his team manage the virtualization stack as well as the identity and access management solution and provide the infrastructure, including the LAMP stack, for the Kuali applications — which are managed by a different group. In effect, the Linux team delivers a platform-as-a-service (PaaS) environment to the team that manages the Kuali applications.

Today, the university has 210 physical and virtual Linux servers, 160 physical and virtual Windows servers, and about 30 Unix servers. The IBM z10 runs both z/OS and z/VM and supports Linux instances on an IFL engine. The university is heavily committed to virtualization as well; currently, about 90% of the Linux instances and about 80% of the Windows instances are virtualized.

"Phenomenal" Growth on x86

Over the past several years, growth on the x86-based servers has been enormous, which benefited both Linux and Windows. While much of that growth has been organic, part of it has also come from Unix migrations. Says the architect, "AIX has been mostly static, running enterprise administrative [applications] and Oracle; our Solaris footprint has been reducing. The past year we have been engaged on a project to move [Solaris] to RHEL." He adds that the Windows growth has been driven mostly by departmental applications, which tend to be available only on Windows. Applications are also being transitioned off the mainframe and are likely to be decommissioned in the next 24 months; the Solaris servers are expected to be fully migrated by early 2013, but the AIX deployment will remain, with a new server scheduled to be installed in the near term in support of an Oracle database deployment that continues to see heavier use.

In the past, Linux use was heavily mixed. "You name it, we have it," says the architect. "Historically, we ran just about any Linux distribution that came our way. Right now, I am pushing us to a Red Hat platform across the board. We only started with Red Hat two years ago because we wanted to deploy the Kuali application, and the [Kuali] community was using Red Hat, so we wanted to be with Red Hat too." The Kuali application is used by a teaching staff and administration staff of 10,000 and is accessed indirectly by 35,000 students.

Red Hat Enterprise Linux Use

Today, the Linux and virtualization architect and his staff support 90 Red Hat servers, with plans to move the remaining 120 Linux servers to Red Hat Enterprise Linux within the next year, expanding the Red Hat footprint at the university.

The benefits, says the Linux architect, include the ability to have a converged skill set. "We speak the same language and [have the same] skills, and I can invest in fewer management tools," he explains. Previously, the university had unique management tools for each of the Linux products in use, including tools for SUSE Linux, Ubuntu, Debian, and Red Hat Enterprise Linux. "The benefits of consolidating on RHEL outweigh the benefits of using multiple distros," he says.

"Application support is what has driven us to Red Hat," adds the architect. "The reality is the commercial apps are certifying for Red Hat [and] for SUSE. In our space, I was seeing a small advantage for certifications on Red Hat over SUSE, so that drove us that way. Open source distros are really good. I have never had real problems with open source distros. It is when we move up the stack toward applications that we need support. If it was not for the commercial software having a certification, I would continue to go down a consolidation path with Debian."

Going forward, the university plans to begin replacing some of its VMware virtualization infrastructure with Red Hat Enterprise Virtualization. "When I look at the Red Hat stack, I can take Linux admins, give them a slight uplift in skill sets, and they become virtualization admins," says the architect. "So I look at a potential future where I have a nice convergence between my RHEL admins and my RHEV admins." However, he adds, "I do anticipate I will be dual hypervisor well out into the future."

The Linux and virtualization architect concludes, "Partnering with a commercial partner like Red Hat, where they have training plans and a great training service, they are a great partner to work with. Don't assume Linux will replace everything you do; it is a tool in your toolbox. I would not advise anybody to just go into their datacenter and move to Linux. Partner with a vendor like Red Hat, but also partner with a community of your peers."

Case Study Takeaways

Best practices

- Consolidating broad mix of Linux distributions to one product
- Cross-training Linux admins with virtualization admin skills
- Leveraging common infrastructure to expand skills standardization

Opportunities

- Accelerate Red Hat Enterprise Linux standardization
- Expand awareness of Red Hat Enterprise Linux value proposition with other departments in the university