

WHITE PAPER

The Role of Linux Servers and Commercial Workloads

Sponsored by: The Linux Foundation

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IDC OPINION

Increasingly, deployments of the Linux server operating system are expanding from infrastructure-oriented workloads to more commercially-oriented workloads such as database, enterprise resource planning (ERP) software and other general business processing, workloads that historically have been the domain of Microsoft Windows and Unix. Where once Linux was seen by customers primarily as a low-cost infrastructure solution, it is now increasingly viewed as a solution for wider and more critical business deployments. IDC has observed the following market shifts:

- ☒ Early deployments of Linux server operating environments (SOEs) heavily favored Web and basic infrastructure deployments, delivering resources such as print and file services, network resources such as DNS serving, DHCP and HTTP serving, and network and system security.
- ☒ Today these basic workload deployments continue to take place in volume, but additional workloads, including database, ERP, decision support, and general business processing, are steadily advancing their share of total workload deployments. IDC research finds that business processing deployments grew from 6.7% of new Linux deployments in 2003 to 8.2% in 2007. Likewise, decision support grew from 7.3% in 2003 to 9.1% in 2007.
- ☒ Spending on software related to Linux SOE platforms is growing quickly — with a 2006–2011 CAGR of 35.7%. Overall spending on Linux SOEs, including software, hardware, and services, is increasing at a 2006–2011 CAGR of 24.1%.
- ☒ Total Linux ecosystem spending — including customer acquisitions of hardware, software, and related services — totaled \$21 billion in 2007 and will grow to \$49 billion in 2011, thanks to continued growth of the installed base of Linux server operating systems into enterprise deployments.
- ☒ We expect Linux to continue applying competitive pressures to other major SOEs, including Windows and Unix. Each of these three platforms has a well-established installed base and will survive over the long term, but market expansion and platform-to-platform migrations, particularly Unix migrations, will continue to be hotly contested by Linux and by Windows.

IN THIS WHITE PAPER

This IDC White Paper presents IDC's perspectives on the changing opportunity for Linux SOE deployments and the workloads that are supported by Linux. This paper considers both workload data and the ecosystem that has grown up to support the opportunity for Linux deployments, including application software, application development and deployment software, and infrastructure software.

SITUATION OVERVIEW

The Disruption Innovation of Linux

Over the past decade, Linux emerged and became a significantly disruptive product to existing, established competitive solutions. Like disruptive SOE products that preceded it, Linux changes the playing field in multiple ways. Compared with Unix, Linux opened up broad access to the attractive price points and multivendor hardware solutions available in the x86 server market while preserving a Unix-like configuration, management, and reliability experience.

Compared with Windows, Linux brought forward some of the favored attributes usually associated with the Unix market, where multiple commercial versions of the operating system provide good application portability across a multivendor environment, reducing hardware and operating system vendor lock-in. Even more importantly, Linux came to market at a variety of price points and with a variety of support options, which range from zero-cost self-support models to enterprise-grade 24 x 7 maintenance and support offerings backed by hardware OEMs and by commercial Linux providers such as Red Hat and Novell. Linux also turned the traditional commercial software development model upside down through its community-based development paradigm.

IDC data collected as far back as 1999 shows the overall volume of Linux adoption ramping up quickly, with that operating system initially seeing frequent deployment for basic infrastructure workloads and Web solutions. In the early years, this adoption was most visible when considering Linux from the perspective of a software-only solution rather than as a new physical server deployment.

This perspective differential existed because Linux was, in many cases, deployed in skunk works projects or without the knowledge of or consent of IT management. The most common deployment platforms for early Linux deployments were aboard either PCs used as servers or aboard recycled or reprovisioned servers that had been decommissioned after supporting another operating system such as Windows or NetWare during its primary life cycle.

The early adoption of Linux was dominated by infrastructure-oriented workloads, often taking over those workloads from an aging Unix server or Windows NT 4.0 server that was being replaced. In other cases, Linux was deployed to support growing corporate Web operations as business-to-business continued to expand online after the dot-com implosion reduced spending on new hardware.

The Growing Linux Ecosystem

Today Linux has clearly earned its stripes as an enterprise solution running infrastructure-oriented workloads, and over the past few years, it has been making a steady transition into a solution used as the foundation for business-oriented workloads. In parallel with this workload transition, the industry has seen a healthy evolution of an ecosystem consisting of related software, hardware, and support services surrounding Linux. This ecosystem grew to over \$21 billion in 2007 and is expected to more than double in revenue by 2011.

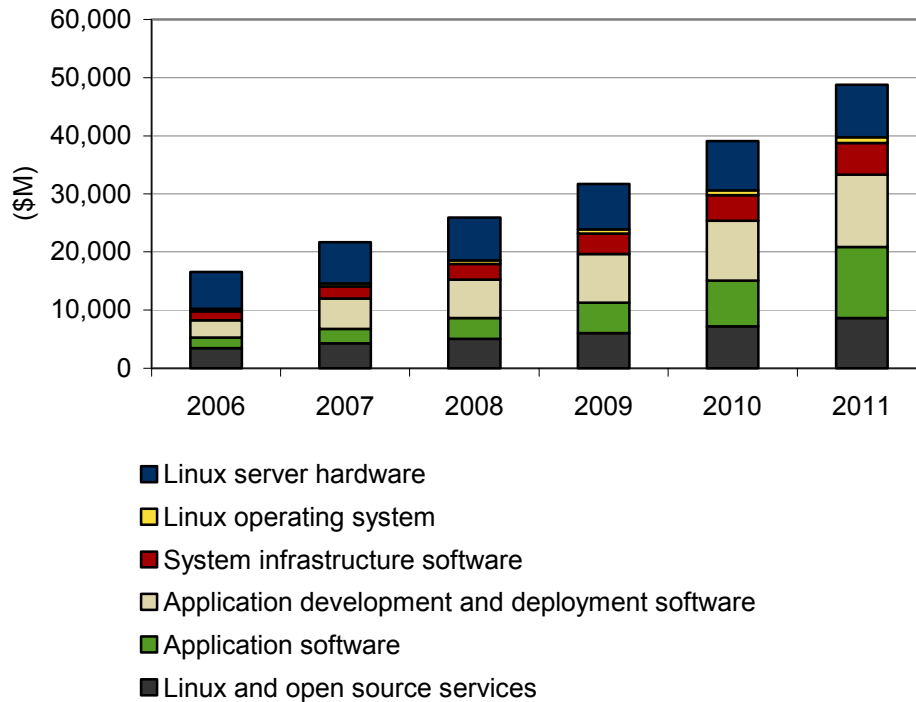
Figure 1 shows the ecosystem enabled by the Linux SOE. The growth shown in Figure 1 is driven by three major components: software, hardware, and services. IDC's projection calls for software revenue to grow faster than either hardware or services revenue. This forecast takes into consideration the shift from infrastructure-oriented workloads to more mainstream business-oriented workloads.

IDC believes that systems integration activities represent the largest opportunity for Linux and open source services, including migration, integration, and deployment. IT education and training services remain one of the smallest open source opportunities but are often considered a door opener to more value-added services such as consulting or systems integration. IDC anticipates that the demand for services related to open source products will grow above the market average for all IT services because of the relative early position on the technology adoption curve that open source solutions hold today.

Of particular note, total software revenue on the Linux platform, at \$10 billion today, currently accounts for 4% of an overall total of \$242 billion. That share is expected to grow to more than 9% by 2011, or \$31 billion in Linux-related software revenue in a total market that will grow to \$330 billion.

FIGURE 1

Worldwide Linux and Open Source Ecosystem Revenue,
2006–2011



Source: IDC, 2008

Figure 1 includes the following elements:

- ☒ Linux hardware revenue, which includes factory revenue associated with the sales of servers that are sold where Linux is deployed as the primary operating system either at the factory or in the channel.
- ☒ Linux operating system revenue, which is primarily SOE revenue.
- ☒ System infrastructure software, which is defined by IDC to include systems management software, security software, storage software, as well as virtualization and clustering software.
- ☒ Application development and deployment software, which includes information and data management software (including RDBMS software), development tools, development life-cycle products, application deployment software (including application serving, transaction, and middleware software products), and data analysis software.

- ☒ Application software, which includes collaborative application software, content management software, ERP software, customer relationship management, supply chain management, manufacturing applications, and engineering applications.
- ☒ Services revenue associated with services and support delivered to Linux deployments. The suite of open source–related services offerings is virtually identical to services available in the industry for competitive SOE environments and includes the following:
 - ☐ Systems integration
 - ☐ Software deployment and support
 - ☐ IS outsourcing
 - ☐ IT education and training
 - ☐ IT consulting

Linux Workload Growth

Figure 2 shows results from IDC's ongoing Server Workload studies, which are modeled against Linux server hardware shipments. This view shows the primary workloads deployed on Linux servers between 2001 and 2007, with projections through 2011 in two-year increments.

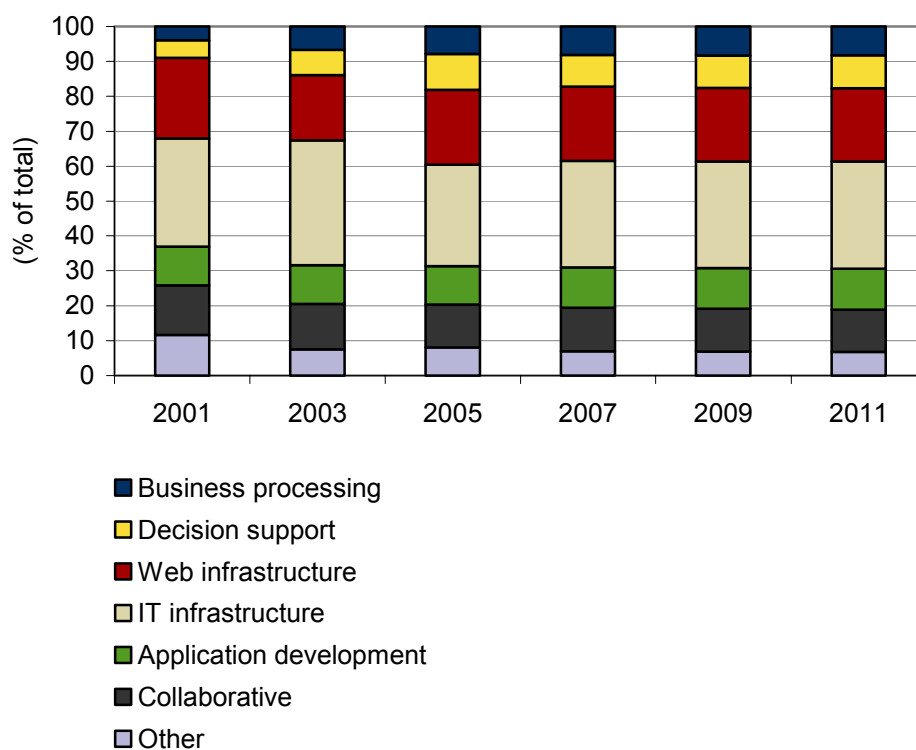
Here we can see that well-established workloads such as Web and IT infrastructure remain a relatively static portion of Linux deployments — capturing over 50% of Linux server deployments, with a slight decline of 2.4% share from 2001 to 2011.

By comparison, business and commercially oriented workloads, including business processing and decision support (which include ERP, CRM, and other common business management solutions), grew through the period, from 9% to 17.7%, an increase of almost 9 percentage points. This growth is the result of slight shifts of workload share from established workloads, including IT infrastructure, Web, collaborative, and the "other workloads" category.

The growth of Linux as a platform for business-oriented workloads appears to be coming largely from migration of existing Unix deployments in combination with organic growth of Linux deployments in these same workload areas.

FIGURE 2

Worldwide Shifts in Linux Server Usage by Workload, 2001–2011

Source: IDC's *Server Workloads Study*, 2007

Database workloads are not explicitly broken out from the other workload categories shown in Figure 2 because database workloads are an integral part of many other workload types. That is, virtually all business-oriented workloads have a database component, as do many Web infrastructure workloads and collaborative workloads.

It is important to note that a flat share of a given workload does not indicate a decreasing opportunity. As the overall size of the Linux opportunity increases, each segment grows in terms of the number of units placed into that workload as well. The segments where shares are growing are simply expanding at a faster rate than the segments where shares are stagnant or are in decline.

Unix-to-Linux Migration

An important enabler of Linux adoption has been the migration of deployments away from Unix on higher-cost RISC platforms to Linux aboard lower-cost industry-standard x86 platforms. Figure 3 provides a view of primary research that IDC has conducted on the topic of Unix migration.

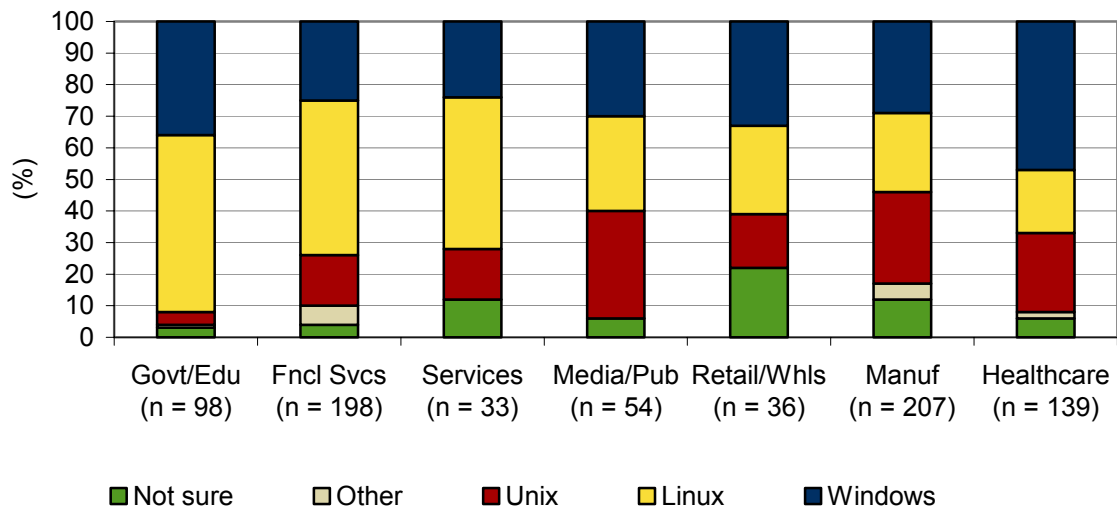
Figure 3 provides a view into the most likely target platform for Unix systems migrations among users who are considering a future migration for their Unix servers. The data in Figure 3 is presented with breakouts for the seven industries that are most receptive to Linux as a replacement for existing Unix servers.

It is evident from Figure 3 that users in verticals such as government, financial services, and general services are highly likely to move to Linux as a replacement for existing Unix servers. Other industries have a lower likelihood of selecting Linux as a replacement for existing Unix server installations but still remain as friendly to Linux as an alternative solution as they are to other migration options.

FIGURE 3

Unix Migration Path by Industry

Q. To which server operating system are you most likely to migrate?



Source: IDC's Unix Migration Study, 2007

FUTURE OUTLOOK

IDC's SOE forecasts call for continued growth of Linux SOEs, with the 2007–2012 CAGR predicted to be 8.2% for combined new paid subscriptions and nonpaid deployments. This growth is driven by multiple factors, including paid subscriptions of commercial Linux distributions that are deployed aboard physical servers, virtual servers, and other hardware types, including redeployed server hardware and PCs and workstations that are used as servers. Free deployments are factored into this forecast as well.

The growth of Linux SOE deployments is made possible in part by the growing ecosystem of products that increases the viability of Linux SOE deployments both from an infrastructure software and application software perspective and from

the increasingly broad enterprise-grade support and services that are available. The overall ecosystem of software, hardware, and services that will develop because of the Linux SOE market presence is projected to grow from \$21 billion in 2007 to \$49 billion in 2011, a 2006–2011 CAGR of 24.1%.

CHALLENGES/OPPORTUNITIES

The continued growth of Linux SOE adoption and deployment is expected to be challenged by a number of factors, but it also has substantial opportunity to take advantage of customer receptiveness to deploy more mission-critical applications aboard the Linux operating system. IDC sees the following factors impacting the Linux SOE market going forward:

- ☒ **Challenge: Unix operating systems.** The market for Unix servers and server operating systems has been squeezed by competitors in recent years, and unit growth and revenue growth have been difficult to achieve at times. Nevertheless, this is a sizable market with a significant ecosystem surrounding it. On the x86 platform specifically, if OpenSolaris gains traction in the market as an alternative open source solution on the x86 platform, Linux could have a more direct competitor on the highest volume platform for Linux.
- ☒ **Opportunity: Unix operating systems.** The growth of the Linux ecosystem has evolved both by capturing net-new market revenue as the market grows and through siphoning off revenue previously spent on other operating systems. In the case of software revenue segments shown in Figure 1, software on the Linux platform currently holds about 4% of the overall market, or \$10 billion of an overall total of \$242 billion. That share is expected to grow to more than 9% by 2011, or \$31 billion in Linux-related software revenue in a total market that will grow to \$330 billion. That growth positions Linux-related software revenue at nearly half of the total of software revenue related to Unix SOE deployments in 2011. Given the natural synergy between Linux and Unix and the large installed base of Unix servers, IDC expects this platform to present a long-term source for future deployments of Linux alongside and as a replacement for retiring Unix installations, especially as next-generation high-performance and energy-efficient systems are embraced.
- ☒ **Challenge: the Windows market.** Windows presents a significant long-term challenge for Linux, since software revenue related primarily to Windows SOE deployments (but including Microsoft's Windows XP and Windows Vista client operating environment revenue) generated \$127 billion in 2007, or 53% of the worldwide software market total that year. Windows will continue to enjoy the largest installed base of any major SOE. By 2011, software revenue related to Windows will grow to \$190 billion, or nearly 58% of the marketwide total of software-related revenue. When it comes to Unix migration opportunities, expect Microsoft to compete vigorously for opportunities in this space in the future.

- ☒ **Opportunity: the Windows market.** Microsoft has shifted its approach to both Linux and other open source technology and today is working both competitively and cooperatively with Linux solutions at a technology and development level. However, the company still takes a highly competitive marketing and sales approach to Linux. This approach improves the ability of Microsoft to sell into Linux-friendly or mixed-platform accounts. The company has yet to deliver any major software products aboard the Linux platform, and IDC does not expect to see any such activity in the near term. In particular, Unix shops that add Linux today will benefit from Microsoft's interoperability efforts.
- ☒ **Opportunity: reduction in the use of discrete software stacks.** IDC sees a shift in the industry that is favoring the configuration of turnkey software stacks that incorporate operating system functionality along with middleware and other infrastructure software components, and potentially with application software as well. This packaging at times takes on a form factor that IDC describes as a "software appliance." If this form factor takes off with end-user adoption, it could consolidate revenue opportunities to those vendors with a strong software portfolio that can be married with a Linux operating system. This trend could result in higher volume deployments of Linux, but it will reduce revenue opportunities for discrete products.

CONCLUSION

Linux continues to drive market shifts in the industry, and early adoption patterns have given way to mainstream deployment that includes a growing portion of business-oriented workloads including database, ERP, CRM, and other line-of-business solutions. The phenomenon of Linux as being seen by business customers primarily as a low-cost infrastructure solution is being increasingly displaced by business deployment of Linux.

Spending on software related to Linux SOE platforms is growing quickly — with a 2006–2011 CAGR of 35.7%. Overall spending on Linux SOEs, including software, hardware, and services, is increasing at a 2006–2011 CAGR of 24.1%.

The Linux ecosystem has strong long-term prospects, with the overall ecosystem spend projected to increase from \$21 billion in 2007 to \$49 billion in 2011. The shifts highlighted in this paper will help drive that trend forward at a healthy rate, as users increasingly use Linux as a key business solution for today's IT challenges.

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