White Paper

Reducing Risk and Improving Security of Cloud Deployments: Why Choose Vendor-Supported Linux Over Self-Supported Linux

Sponsored by: Red Hat

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IDC OPINION

Operating systems (OSs) are a central pillar of the enterprise infrastructure stack. They are the glue that binds together software applications and the physical system hardware that sits underneath them. Over time, OSs have continued to evolve with the changing needs and dynamics of the enterprise IT space as organizations undergo digital transformation (DX) aimed at better serving customer and stakeholder needs, which have allowed them to unlock greater business value. As enterprise IT consumption patterns have changed over time and incorporated cloud technologies, the OSs in support of these workloads have adapted as well to further meet these needs.

For the major enterprise OS platforms, Linux has become increasingly popular among customers over time, which is a trend that has been long documented by IDC. Linux boasts a variety of benefits, including performance, security, flexibility, and cost, which makes it an appealing choice over other operating system types, which customers can expect regardless of location (traditional datacenters, private clouds, and public clouds) or deployment type (bare metal, virtualized, and containerized). With this in mind, it should come as no surprise that Linux has become quite ubiquitous within organizations over time. In fact, IDC research shows that Linux now sits on more physical servers than any other OS platform[1]. It also has long since overtaken the majority of the virtualized OS installed base, particularly in the public cloud.

The role of the public cloud cannot be understated in today's enterprise IT ecosystem as organizations around the world have been able to take advantage of compute and storage services on demand in support of their workloads. The explosion in demand for public cloud services has persisted for over a decade and was only further amplified over the past several years during the global COVID-19 pandemic. Its trajectory since then has remained largely consistent as organizations continue to create and move workloads into the public cloud. As a result, we estimate spending on public cloud infrastructure will exceed that of traditional IT deployments for the first time in 2023.

Many of the top concerns around performance, security, and cost are shared among operating system and public cloud services users. Some will attempt to use self-supported software solutions in addressing these needs to minimize initial costs but often fail to realize the intrinsic and other

[1]See *Worldwide Server Operating System Environments Market Shares, 2022: Steady Growth Persists* (IDC #US51038623, July 2023) for more details.

opportunity costs associated with maintaining their environments on their own. Prior IDC research has shown that in many of these cases, buyers would have been better off forming strategic partnerships with suppliers as they build and modernize their IT stacks, leaving them to focus on the core business activities they do best. It also stands to reason that in the case of buyers with more technically complex hybrid and multicloud environments, there is additional value to be had by engaging with specialized commercial vendors that have expertise and a broad partner network in the space.

This is where vendors such as Red Hat come into play. With over 30 years of experience in the infrastructure software business, Red Hat meets this description and offers potential buyers a deep portfolio of commercially hardened software products, including its flagship operating system product Red Hat Enterprise Linux (RHEL). RHEL provides buyers with a performance-rich, secure, and flexible foundational component for their infrastructure stacks no matter where they are deployed. Moreover, given the recent changes in the OS space around CentOS Linux, RHEL as a commercially supported product is a more-than-capable alternative for CentOS Linux users seeking to migrate their workloads to another OS, whether they be on premises or in the cloud.

This white paper discusses server operating system environments and their role in the cloud as well as buyer considerations when choosing commercially supported OSs. Further, this white paper provides an overview of the changes to CentOS Linux and presents RHEL as a commercial OS alternative for users. It also provides buyers with recommendations around OS and public cloud service provider selection.

SITUATION OVERVIEW

Enterprise IT Trends in the Public Cloud

The public cloud has long since become a critical component of organizations' digital infrastructure strategies. It is also one of the largest and fastest-growing segments of the overall IT ecosystem. IDC estimates the public cloud infrastructure-as-a-service (IaaS) market reached $113 billion in 2022, with compute IaaS contributing just under $65 billion toward that total[2]. IDC projects that by 2027, each of those markets will grow to just under three times their current sizes as organizations continue to modernize and upgrade their digital infrastructures.

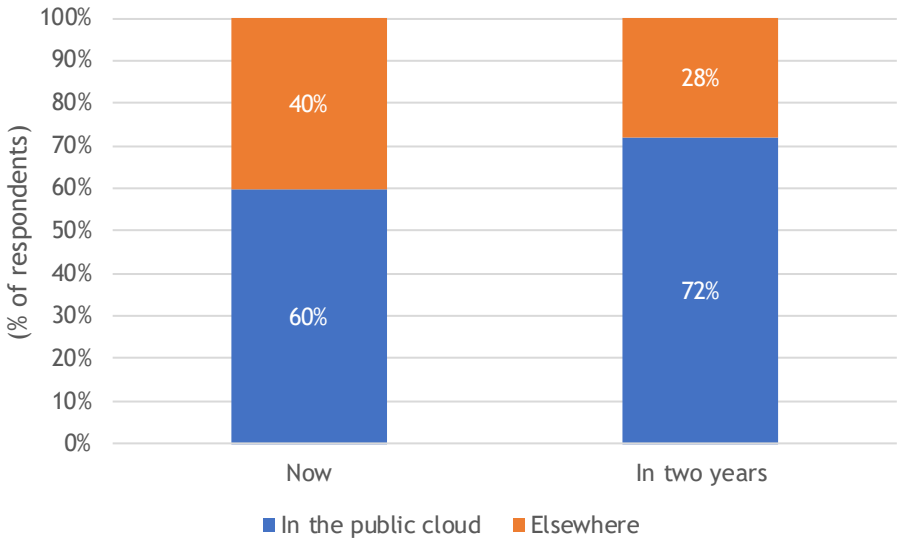
These certainly are impressive figures by themselves, and over time, we expect organizations' reliance on public cloud services to only grow. For many organizations, this will include both net-new workloads that they intend to create in the public cloud and the workload migrations from on-premises and other environments. In a recent survey conducted by IDC, respondents anticipated the percentage of their workloads deployed in the public cloud to grow from 60% to 72% over the next two years (see Figure 1).

[2]See *Worldwide Public Cloud Infrastructure as a Service Market Shares, 2022: Investments in High-Performance Services Create Differentiation* (IDC #US51035622, July 2023) for more details.

FIGURE 1

Workloads in the Public Cloud

Q. *What percentage of all workloads running in your organization run in the public cloud? What percentage will run in the public cloud in two years?*



n = 600

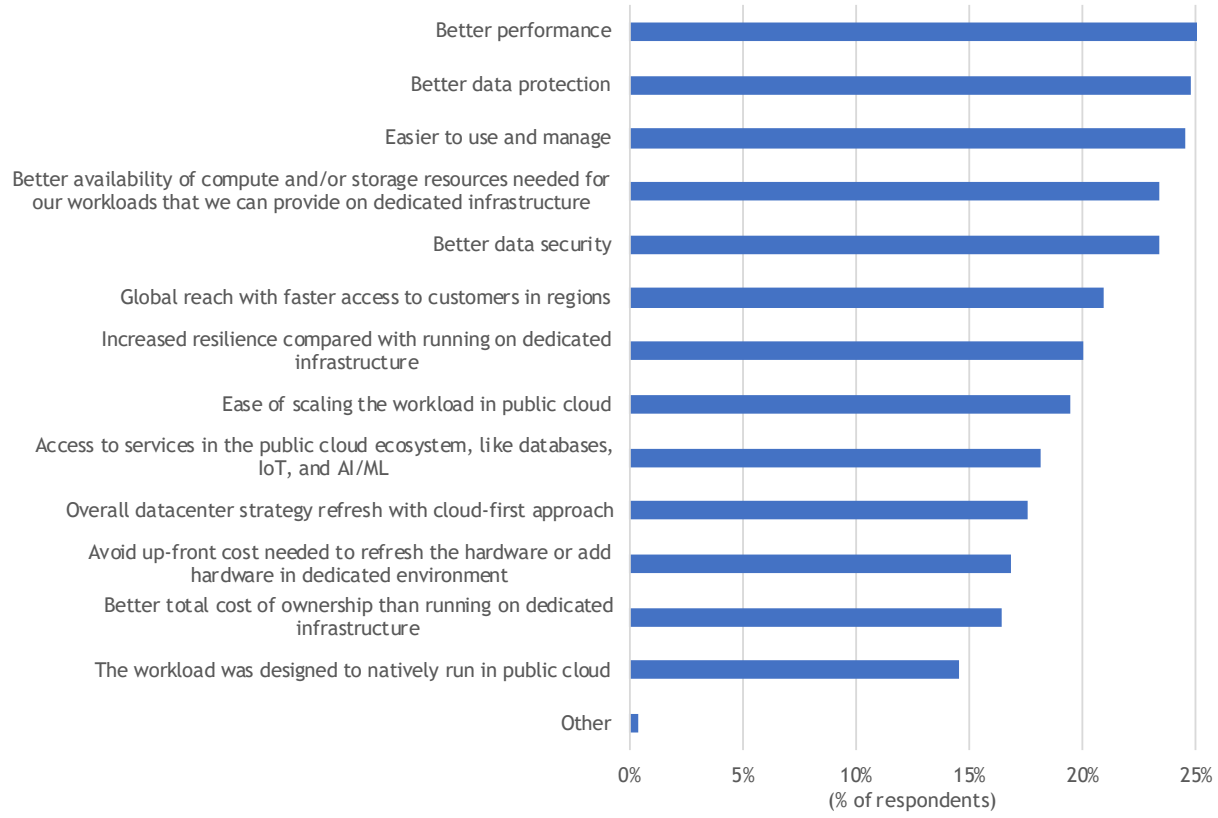
Source: IDC's *Enterprise Infrastructure Workloads Survey,* November 2022

Among these respondents, there were a variety of factors influencing their anticipated increased usage of the public cloud including better workload performance, security, data protection, and access to compute and storage resources when compared with other environments. Factors associated with cloud-native strategies also ranked somewhat highly on the list (see Figure 2).

FIGURE 2

Factors for Selecting the Public Cloud

Q. What are the most important factors that impact the decision to run [your] workloads fully or mostly in multitenant environments (public cloud) rather than single-tenant (dedicated) environments?



n = 529

Source: IDC's *Enterprise Infrastructure Workloads Survey,* November 2022

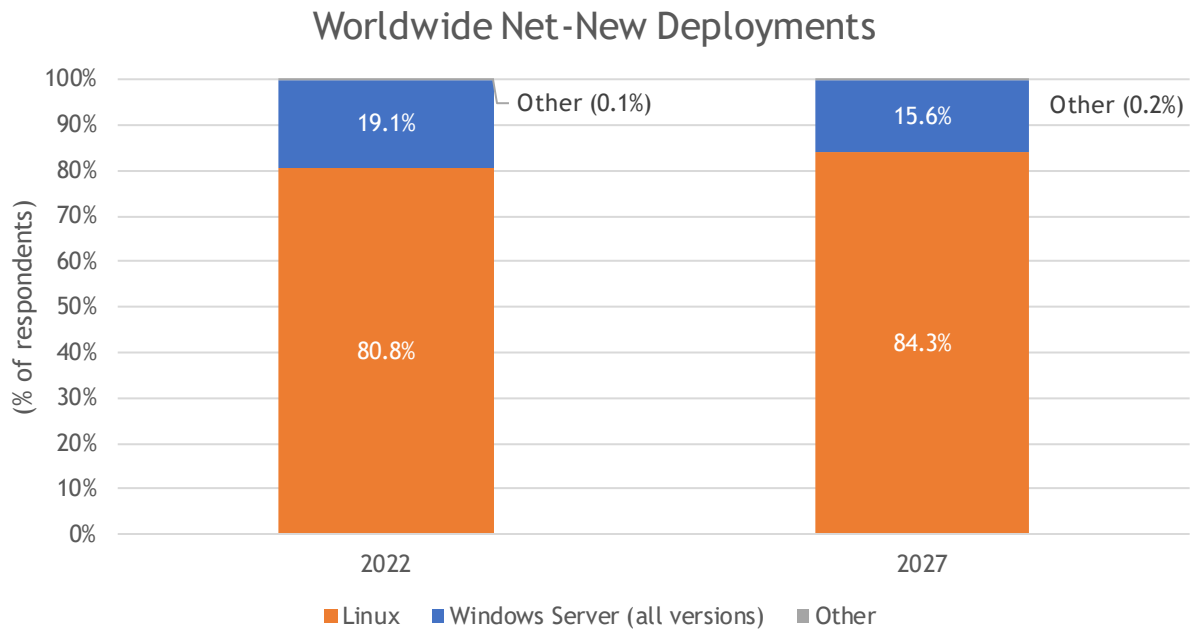
The Enterprise Server Operating Systems Market Continues to Shift Toward Linux

At the heart of IT deployments, whether they be in the public cloud or elsewhere, is operating systems. In the enterprise server operating systems market, more specifically, an overarching shift toward Linux is a trend that has been well documented by IDC for over a decade. Our more recent research shows the global pandemic amplified this trend as IT buyers and service providers moved and created workloads in the cloud to meet the rising IT needs of their customers. Since the peak of the global pandemic, some workloads have been moved back on premises, but most workloads are still being created or moved to the cloud, and the majority are deployed on Linux.

How does this play out in numbers? Our estimates show that by 2027, 84% of all net-new OS deployments (physical or virtualized) will run Linux, up from 81% in 2022 (see Figure 3). This equates to a projected five-year compound annual growth rate of 12.8% for Linux-based net-new deployments, which is notably faster than the expected growth rate of the rest of the market. This is an impressive rate of expansion for nearly any market IDC tracks, let alone for one with as long of a history as server operating systems.

FIGURE 3

Worldwide Server Operating System Market Shares, 2022 and 2027



Note: For more details, see *Worldwide Server Operating System Environments Forecast, 2023-2027: Demand Set to Remain Strong* (IDC #US51029923, July 2023).

Source: IDC, 2023

Why Organizations Choose Commercial Linux in the Cloud

When it comes to Linux, one of the main choices organizations must make is deciding whether to deploy nonpaid, self-supported Linux or commercially supported Linux. The main motivating factor for organizations deploying nonpaid Linux is straightforward enough in that their users are provided a functional server operating system at no cost that can be further customized as needed, thanks to its openly available source code. While there are numerous nonpaid Linux-based OSs out there, the most popular ones among them are derived from and are actively maintained by a vibrant community of developers, which creates quite a unique ecosystem dynamic.

The benefits of Linux are well known by its users. Like with other open source software, Linux has allowed businesses of all sizes around the world to better compete in the digital economy at significantly lower up-front costs. Many commercial suppliers (including Red Hat) have also benefitted from the open source software ecosystem and have built their offerings around refining and hardening open source code to meet the needs of a broader enterprise user audience. That said, when comparing nonpaid, self-supported Linux with commercially supported Linux, the use of nonpaid Linux distributions does incur additional costs in terms of internal company staff time and/or a third party contracted to update and maintain these deployments in addition to other consumption costs for OS installations in the public cloud. While some public cloud service providers maintain their own Linux distributions that they bundle with other compute services, choosing to deploy these types of OSs does create inherent lock-in with that provider in addition to other limitations in terms of being deployed in other IT environments outside of the public cloud.

While the "nonpaid/self-supported versus commercially supported Linux" debate continues among users, some of the main reasons customers choose commercially supported Linux are as follows:

- **Accessing hardened, commercially available software.** Commercial software vendors provide the highly valued service of hardening inputs adapted from available open source code bases and other project initiatives. This includes rigorous testing of their software products to ensure they operate robustly, scale appropriately, and function as expected. The role of commercial OS vendors may also include adding in or editing code to provide additional layers of security and stability compared with other open source alternatives. Moreover, commercial OS offerings are typically well integrated with the rest of a vendor's portfolio, which offers customers the added benefit of a "one stop" experience when deploying and managing their infrastructure stacks.
- **Ensuring the security of their IT environments.** When it comes to security, the value of commercial OS support cannot be understated. Should problems arise, commercial vendors can quickly provide qualified patches, which lower the amount of support that would otherwise be placed on organizational IT departments. These fixes are tested by the vendor before being implemented by customers, with additional layers of support offered post installation should there be any issues with deployment. Commercial software vendors also tend to be notified of security risks and vulnerabilities ahead of the general public, allowing them to be ahead of the curve when building patches and updates for their customers.
- **Making IT costs more predictable.** In an increasingly hybrid IT world, customers frequently cite the "surprise" bill among their biggest pain points, particularly as they familiarize themselves with their evolving, distributed IT environments. Predictable licensing and support costs for commercial OSs based on easily understood metrics (such as servers, sockets, physical and virtual cores, and virtual machines [VMs]) can go a long way in helping alleviate these types of cost-related concerns. Our research also shows commercial OSs most often tend to be more efficient than other nonpaid alternatives, which allows for higher workload density per unit of compute that can lead to lower costs. Further, the testing, qualification, and certification work performed by commercial vendors prior to release will save time for users that would have otherwise had to do these activities themselves, which enables them to undertake other more productive projects.
- **Providing a predictable and consumable life cycle.** Organizations tend to upgrade their IT infrastructure once every several years in concert with their core business needs or hardware refresh cycles. In the world of IT, this is a lot of time. Often, several versions of an individual piece of open source software have been released in that amount of time with no guarantee of compatibility, which can cause further business disruption during the upgrade process.

Commercial OS vendors, on the other hand, roll forward previous OS builds and features into more current versions while ensuring compatibility with older APIs and other software dependencies that could serve as points of failure during the upgrade process. Many commercial vendors will also maintain older OS versions with the same levels of service and support as they do with more recent versions for those customers still running legacy workloads or those waiting to upgrade their infrastructure for other reasons. Some commercial vendors (such as Red Hat) will offer this level of support for their operating systems for as many as 10 years.

- **Ensuring global support with enterprise SLAs.** Thanks to their code hardening and better security postures among other software features and support, commercial OSs are typically more enterprise ready than their nonpaid counterparts when it comes to supporting more mission-critical and business-critical workloads. This includes maximizing infrastructure performance and application uptime across IT environments (core, cloud, and edge) while ensuring individual workloads remain secure and compliant with local and federal data regulations. Moreover, customers stand to benefit by partnering with commercial OS vendors that often have long-standing expertise and experience serving some of the world's largest organizations at scale while meeting (and often exceeding) their SLAs.

The Challenges of Nonpaid Linux in the Cloud for Customers

As enterprises continue to build and move their workloads into the cloud, they must contend with a handful of challenges, including (but not limited to) security and compliance, performance, management at scale, and application portability and compatibility within their IT ecosystems. While all of this is possible to achieve through nonpaid OSs, IDC research has consistently shown that organizations that opt for commercial OSs can expect to achieve greater business value and lower total costs of ownership (TCOs).

Why is this? Our research finds there are numerous sources of hidden costs associated with organizations that choose to self-support their IT environments. These costs can be direct — through increased staff time dedicated to day-to-day maintenance and servicing (e.g., patching and updating) — or indirect through the opportunity costs of staff time spent performing these activities. In addition, our research shows that organizations that opt to deploy commercial OSs are far less likely to experience IT downtime than those that choose to self-support.

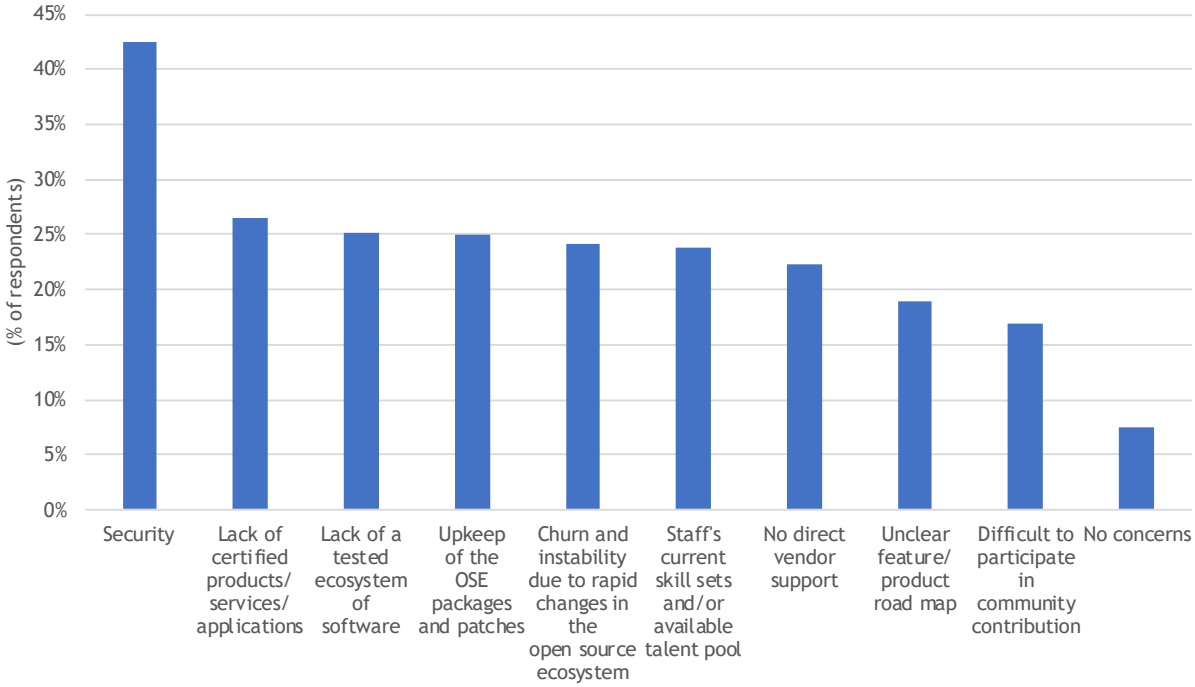
These are all benefits of commercial OSs that become amplified when deploying at scale, especially in the cloud as enterprise IT environments become increasingly distributed and more complex.

Figure 4 lists additional concerns among IT buyers regarding deploying community open source Linux in public cloud environments.

FIGURE 4

Concerns About Community Open Source Linux

Q. In general, what are your organization's concerns around the use of nonpaid/free community Linux operating systems in the public cloud?



n = 1,300

Source: IDC's *Red Hat Server Operating System Environments Survey,* April 2023

As the data indicates, IT buyers most often cite security (and other related issues, such as compliance) as their main concern when deploying nonpaid Linux in the public cloud. This includes the direct security of enterprise data assets when deploying nonpaid Linux as the underlying operating system as well as associated reputational damage to an organization after its systems are compromised. As organizations continue to deploy their IT in a hybrid manner between on-premises and cloud environments (and increasingly at the edge), they stand to benefit by deploying their workloads on an operating system that best unifies their set of environments – optimally under a single management source – which helps reduce system exposure and risk. Compared with their nonpaid counterparts, commercial Linux OSs offer an enhanced security posture and management experience that is consistent between environment types.

Other top concerns among IT buyers when deploying nonpaid Linux in the public cloud relate to other certified products, services, and applications, as well as a lack of a tested software ecosystem. No single vendor has all the solutions customers are looking for, even at the bottom of the infrastructure stack, which makes having a wide network of hardware, software, and services partners a compelling differentiator in the IT buying process. Commercial Linux vendors strive to maintain a wide range of

strategic partners to meet customers where they are in their IT and digital journeys. In contrast, there is no guarantee of these types of certifications or compatibility when deploying nonpaid Linux.

Changes to CentOS Linux

In December 2020, the CentOS Project announced there would be no CentOS Linux 9; CentOS Linux 8 would receive updates until December 2021, and CentOS Linux 7 would receive updates through June 2024.

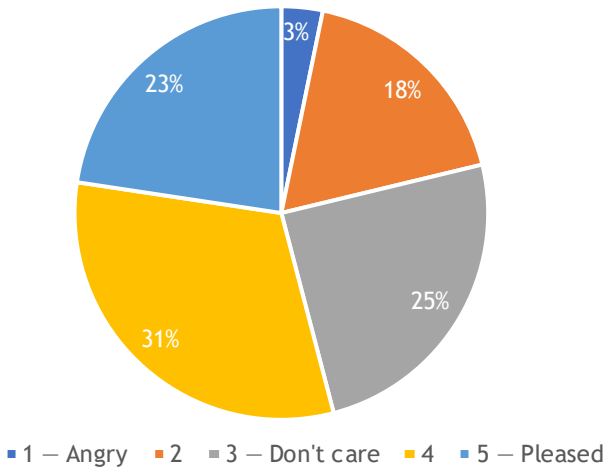
Although users can still access the upstream CentOS Stream source code, these announcements related to the downstream CentOS Linux have caused uncertainty among users while the market adapts and figures out other possible alternatives. That said, for organizations considering other nonpaid, self-supported Linux distros as replacements for their CentOS Linux environments, many currently find themselves weighing the benefits of nonpaid Linux operating systems versus the risk of this kind of predicament happening again in the future.

Figure 5 shows customer sentiment around the announced changes to CentOS Linux. About 54% of respondents indicated positive sentiment (a rating of "4" or "5"), with an additional 25% saying they are ambivalent about it or "don't care." While this is a result that may seem surprising at first, it is a reasonable one. Organizations interviewed by IDC often cited sprawl of CentOS Linux deployments in their IT environments as a noteworthy pain point and were often surprised by just how much CentOS Linux there was. Nevertheless, these organizations are now faced with the decision of what to do with these deployments as they cannot leave them unsecured.

FIGURE 5

Sentiment About CentOS Updates

Q. *In December 2020, CentOS.org announced there will not be a CentOS Linux 9; updates for CentOS Linux 8 will continue until December 2021; and updates for CentOS Linux 7 will continue until June 2024. How do you feel about this announcement?*



n = 1,300

Source: IDC's *Red Hat Server Operating System Environments Survey,* April 2023

Why IT Buyers Choose Red Hat Enterprise Linux

So what does this mean for IT buyers? Whether they are creating new projects, modernizing existing ones, or even looking for a replacement for their CentOS Linux workloads, buyers can look to RHEL as an OS target for their future IT deployments. RHEL remains a highly popular choice among technology buyers and is the number 1 commercial Linux product in the market with just under 80% share of the segment[3].

Regardless of where buyers may be coming from or where they are in their digital or cloud-native journey, they can expect the following benefits as an RHEL customer:

- A dedicated CentOS Linux 7 migration offering and tooling for users via Convert2RHEL, which maintains customizations, configurations, and preferences from CentOS Linux environments when switching to RHEL, all at a reduced price per server through June 2028
- 24 x 7 customer support with OS scalability for mission-critical and business-critical enterprise applications as organizations continue to grow their IT environments
- "Always on" security through built-in features such as live kernel patching in addition to a trusted and secure software supply chain
- A predictable RHEL product road map and a 10-year support life cycle for each major version
- A performance-rich and consistent IT experience, from core to cloud to edge, that spans the spectrum of hardware architectures (x86 and non-x86, including ARM, IBM Power, IBM Z, and IBM LinuxONE)
- An extensive partner ecosystem of thousands of hardware, software, and cloud service providers
- Access to a deep Red Hat product portfolio that includes other infrastructure automation and management tools such as Red Hat Insights and Red Hat Satellite

Red Hat Insights comes bundled with all RHEL subscriptions. Red Hat Insights allows operations teams to analyze their IT footprints through a single dashboard and provides recommendations that help track performance and costs in addition to identifying potential security risks and vulnerabilities of their OS environments.

Red Hat Satellite is an add-on to RHEL that is used to provision the OS on bare metal, virtual, and private and public cloud environments as well as to automate basic system tasks like patching and updating through a centralized console. In addition, Red Hat Satellite can help manage an organization's full set of Red Hat subscriptions to ensure license compliance and to report on usage.

CHALLENGES AND OPPORTUNITIES

- **Challenge:** Many CentOS Linux users are finding themselves displaced by recent announcements concerning the OS and need alternatives for their CentOS Linux–based workloads, particularly for ones they consider to be mission critical or business critical. Complicating matters further for many of these users is the sheer number of CentOS Linux deployments — which, for many, also include shadow deployments — in their environments.

[3]See *Worldwide Server Operating System Environments Market Shares, 2022: Steady Growth Persists* (IDC #US51038623, July 2023) for more details.

- **Opportunity:** Although there is significant work to be done when switching between OSs, impacted CentOS Linux users find themselves facing a condensed timeline to find a suitable replacement OS target. These users can benefit by partnering with providers that can help them migrate their CentOS Linux–based workloads efficiently while prioritizing security and reliability. Providers such as Red Hat offer dedicated training, consulting, and tooling to help CentOS Linux users migrate their workloads to RHEL, whether on premises or in the cloud. Red Hat's newly announced offering Red Hat Enterprise Linux for Third Party Linux Migration does exactly that, allowing CentOS Linux 7 users to move to Red Hat Enterprise Linux 7 while receiving an additional four years of support beyond CentOS Linux 7's scheduled end-of-life (EOL) date in June 2024.
- **Challenge:** The enterprise server operating systems market continues to be commoditized by free, open source OS variants, which are typically Linux based. This is a trend that has persisted for several years. However, when combined with organizational budgetary challenges in today's global economic climate, this may further push buyers to opt for nonpaid OSs.
- **Opportunity:** Commercial Linux suppliers can demonstrate the value-add they bring to organizations through their OS offerings and other related and complementary offerings. This is especially true for suppliers such as Red Hat, which has over 30 years of experience and expertise in the enterprise infrastructure software business.

ESSENTIAL GUIDANCE FOR THE IT BUYER

Many enterprise IT buyers today are finding themselves at a crossroad. Technology is only becoming more complex as the needs and demands of organizations continue to evolve. For many, creating a successful IT strategy and road map can seem like trying to reach an ever-moving target. Customers in these cases stand to benefit by partnering with providers that can best support and unify their IT stacks. Operating systems (and other infrastructure software) are one of the many components of that.

When selecting between server operating systems, IDC offers the following pieces of advice to IT buyers:

- Focus on the core business activities your organization specializes in, regardless of how the underlying workloads are being deployed.
- Consider your organization's IT road map as well as any potential changes to it and/or new projects and initiatives. Adapt your infrastructure strategy (including hardware and software) accordingly.
- When comparing the costs and benefits associated with deploying commercial and open source software, be sure to accurately account for the time spent and opportunity costs associated with self-supporting your organization's environments, including downtime.
- Look to other organizations that are farther along in their digital transformation and cloud journeys and particularly to those with more complex infrastructure deployments spanning multiple types of workloads, IT locations, and deployment type models that they have been able to successfully navigate.

And when opting to deploy commercial OSs, buyers should consider these additional factors when choosing between suppliers:

- The availability and level of commercial enterprise-grade service and support
- The ability to quickly deploy patches and updates, including live patching

- A proven track record of reliability and scalability with optimizations for on-premises, cloud, and edge deployments
- Support for bare metal, virtual machine, cloud, and containerized environments
- Support for a variety of development tools and frameworks, including edge, AI/ML, and IoT
- A large partner network of hardware, software, and services vendors that certify your OS products

CONCLUSION

Operating systems have sat for decades at the heart of organizations' IT strategies as a foundational pillar of their infrastructure stacks between the underlying hardware and the applications that run on top of them. Over time, IT has continued to trend from traditional datacenter models toward hybrid and multicloud environments, which for many has necessitated changes in technology strategies down even to the OS level. As organizations continue to modernize their infrastructure stacks beyond a singular core datacenter while moving and creating workloads in the cloud, they are considering related changes to their OS deployment strategies as well. For many, they desire an OS (or set of OSs) that can unify their workloads between environments while maximizing performance, uptime, security, and compliance. IDC research shows that there are potentially hundreds of enterprise server OSs out there when accounting for the availability of Linux OSs, which makes the decision process for these organizations much more challenging. While some may opt for nonpaid OSs that they can acquire at no up-front cost, these users often fail to identify the implicit costs of self-supporting their environments and the unpredictability of their road maps. Happenings in the community-based Linux market over the past several months alone prove that this unpredictability is becoming more of a pain point for these nonpaid, self-supported OS users.

This is where commercially supported OSs such as Red Hat Enterprise Linux have a noticeable upside for buyers seeking to upgrade and modernize their technology stacks. RHEL is an enterprise-ready Linux operating system that has been trusted by many of the world's largest companies for over 30 years. It also happens to be the most widely deployed commercial server operating system in the market today. By partnering with Red Hat, RHEL customers can expect a performance-rich, secure, and compliant technology experience that extends from the core to the cloud to the edge for organizations in pursuit of digital transformation while maximizing the value of their technology investments.

MESSAGE FROM THE SPONSOR

Red Hat Enterprise Linux enables you to deploy and run applications anywhere – from physical and virtual, to private and public clouds, and out to the edge – by delivering the consistent operating foundation needed for modern IT and enterprise hybrid cloud deployments. From your first steps installing, migrating, or upgrading Red Hat Enterprise Linux to eventually deploying across multiple clouds, we provide utilities to help.

Making it easier for CentOS Linux users to access Red Hat Enterprise Linux

Red Hat Enterprise Linux for Third Party Linux Migration provides a competitively priced subscription and a simplified conversion process for CentOS Linux users. For organizations that need more time past the CentOS Linux EOL date, this offering is also available with up to four years of security patches and updates to RHEL 7 so you can maintain consistency in your environment until you're ready to upgrade to a more current release.

No-cost Red Hat Developer Subscription for Teams enables organizations running Red Hat technologies in production to adopt RHEL for development and test at no additional cost for qualifying use cases. It streamlines time to launch for new applications, and reduces the risk of incompatibilities and issues at launch. Red Hat Enterprise Linux delivers easy access to reliable operating system images in the cloud as well as the toolchains, libraries, container tools, and runtimes needed to streamline the path from development to production.

About IDC

International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications, and consumer technology markets. With more than 1,300 analysts worldwide, IDC offers global, regional, and local expertise on technology, IT benchmarking and sourcing, and industry opportunities and trends in over 110 countries. IDC's analysis and insight helps IT professionals, business executives, and the investment community to make fact-based technology decisions and to achieve their key business objectives. Founded in 1964, IDC is a wholly owned subsidiary of International Data Group (IDG, Inc.).

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