

White Paper

Moving to the Public Cloud: The Strategic Role of Server Operating System Environments

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May 2020

IN THIS WHITE PAPER

Cloud computing environments have become a fundamental part of modern enterprise IT infrastructure, delivering business value ranging from cost savings and infrastructure flexibility to access to new technologies and web-based services. The journey to public cloud is almost always part of a larger digital transformation (DX) that includes the migration and expansion of enterprise workloads as well as the use of next-generation technologies such as data analytics, artificial intelligence (AI), and machine learning (ML). The gravity drawing IT to the public cloud is generating demand and creating requirements for new server operating system environment (S-OSE). As DX trends proliferate, more organizations face the challenging tasks of embracing change while minimizing disruption to current operations and reducing the friction of cloud deployments.

S-OSE selection can help companies mitigate or solve many of these challenges. IDC expects that more enterprises will choose Linux, particularly commercial distros, as they transform and modernize IT environments. Commercial Linux is the most widely deployed S-OSE in the public cloud. Linux is a preferred platform for modern infrastructure, including hosting traditional as well as next-generation applications (NGAs). Furthermore, the OS is flexible in terms of the delivery method (i.e., bare metal, virtualized, or containerized) or deployment (i.e., public cloud, private cloud, or traditional IT). IDC believes Linux is foundational to the development and proliferation of 3rd Platform technologies such as cloud and mobility as well as innovation accelerators such as analytics, AI, ML, and the Internet of Things (IoT).

This IDC White Paper includes data and insights from two IDC surveys: IDC's 2019 *IaaSView Survey*, which surveyed more than 1,500 IT decision makers on global public cloud IaaS adoption by enterprises, and IDC's August 2019 *Linux in the Public Cloud Survey*, a survey of more than 700 IT decision makers involved in IT strategy and infrastructure purchasing, as well as application strategy and OSE selection, in hosted or public cloud infrastructure.

SITUATION OVERVIEW

Cloud Is Fundamental to Modern Enterprise IT Infrastructure

Cloud-based infrastructure deployments have increased in popularity because of many benefits, including reduced costs and complexity as well as improved flexibility. Of all the varieties of cloud infrastructure (private, public, or hybrid, on premises or off premises), public cloud is frequently chosen as the mechanism to access new technologies and facilitate modernization of IT, particularly for new DX initiatives and pilot proof-of-concept projects. Running applications on public cloud makes it easy for IT organizations to leverage next-generation infrastructure and architecture technologies such as heterogeneous and accelerated computing (AC), computing architectures like massively parallel computing (MPC), and use cases like artificial intelligence and high-performance computing (HPC).

According to IDC's August 2019 *Linux in the Public Cloud Survey*, customers are using three or more public cloud providers on average, revealing that multicloud deployments are now the norm for enterprise organizations. 84% of respondents either currently have or plan to implement a hybrid cloud IT infrastructure. Driving this has been a growing number of partnerships across traditional enterprise IT technology companies and public cloud providers, highlighting the emphasis and prioritization of hybrid infrastructure and the need for a coherent experience across public cloud and on-premises infrastructure.

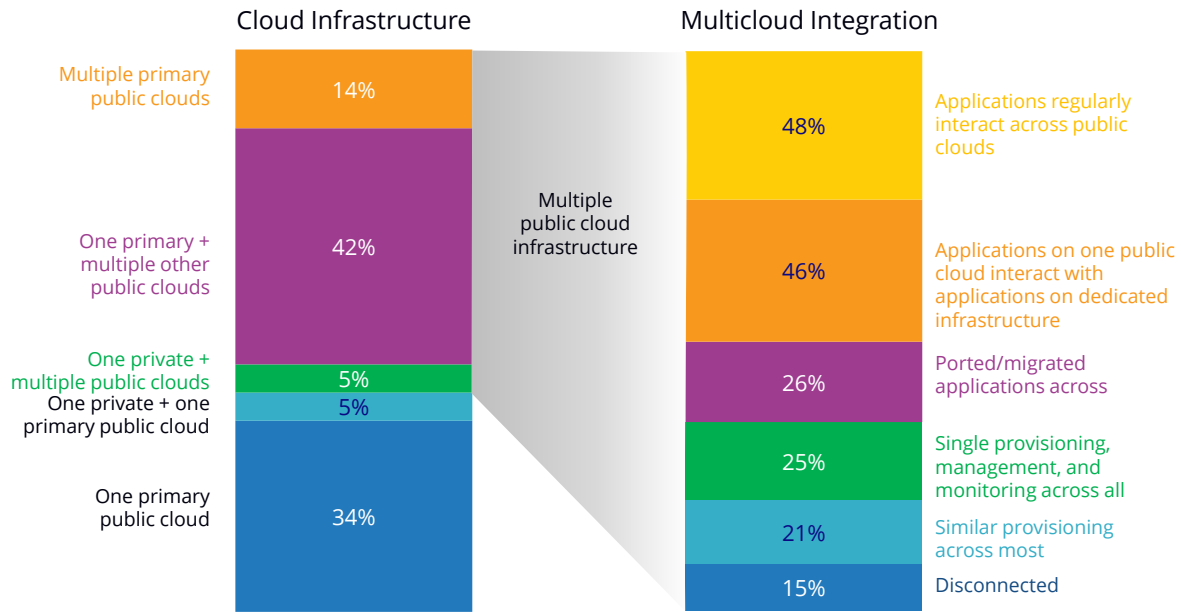
Hybrid multicloud environments will be the default infrastructure approach moving forward. While 34% of IT decision makers¹ report using only a single provider's public cloud infrastructure, twice that number (66%) leverage different cloud platforms across multiple service providers, according to IDC's *IaaSView Survey* (see Figure 1). In organizations that use multiple public clouds, there is a significant integration needed or applied in such diverse infrastructure. Nearly half of the respondents reported that their applications regularly interact across various public clouds, while only 15% said their multicloud environments are disconnected. 25% of respondents reported having single provisioning, management, and monitoring across their multicloud environment. These responses show a healthy level of cloud integration well underway.

¹ For more details, see *IaaSView 2019: Worldwide Survey Results* (IDC #US45653819, November 2019).

FIGURE 1

Customers Default to Multicloud Environments

- Q. How do you characterize your company's approach to using public cloud IaaS services?
- Q. Which of the following characterizes the level of integration in your use of multiple public cloud IaaS providers?



Note: For more details, see *IaaSView 2019: Worldwide Survey Results* (IDC #US45653819, November 2019).

Source: IDC's *IaaSView Survey*, 2019

Public Cloud Is Integral to Digital Transformation

Increasing acceptance of digital transformation and execution on the DX journey by enterprises will increase the focus on newer technology capabilities. Such advanced technologies will extend the digital reach of the enterprise and increase the business value of data. Public cloud will continue to be the easiest to access for these newer technologies for most enterprises over the next five years. Consequently, public cloud adoption will not be driven purely by total cost of ownership (TCO) considerations but by virtue of the broader access to emerging DX technologies and the promise of the business value they bring.

The majority of enterprises are either strategically or gradually embracing DX. According to IDC's *Linux in the Public Cloud Survey*, a combined 33% of survey respondents reported either having a mature DX investment plan in place or DX as core to their business; an additional one-third of respondents are gradually embracing DX. Only one-third of respondents reported having very few or no plans to embrace DX.

The Key Role of Public Cloud in DX Projects

2018 saw a tipping point in public cloud adoption as enterprises across the board started using public cloud infrastructure for both traditional enterprise applications and new web-based services. According to IDC's *IaaSView Survey*, of the workloads deployed to public cloud infrastructure, 48% are "born on the cloud," but 52% of workloads that are existing custom or commercial off-the-shelf (COTS) software packages are being migrated to public cloud from another space.² Enterprise workload expansion and migration is the current center of gravity for public cloud adoption momentum. A pattern seen among early cloud adopters is to initially move workloads to a public cloud with minimal or no changes (commonly referred to as "lift and shift"). Once workloads successfully run in the public cloud, there follows an in-place rearchitecting of the workloads to leverage the advanced cloud-based services (i.e., containerized/serverless architectures, scale-out application platforms, data analytics frameworks). These next-generation DX enablers are a growing portion of the enterprise portfolio being executed on public cloud infrastructure.

An overwhelming majority (91%) of surveyed businesses reported that the move to the public cloud was part of a bigger DX initiative. When businesses were asked about the top strategies for optimizing IT operations, the top 2 responses were data migration and expanding cloud initiatives. Frequently, cloud and big data go hand in hand as businesses seek advanced cloud-delivered technologies to extract value from their data. Other top strategies expressed were operational: leveraging end-to-end automation, developing new skill sets, and consolidation of datacenters as well as applications.

Benefits from IT Transformation

When respondents were questioned about the benefits their organizations want to achieve through the IT transformation initiatives, four aspects topped their lists (see Figure 2). Managing data growth had the highest response. There are a variety of aspects to this, from being able to control the influx of big data to the desire to leverage and monetize the vast amount and variety of data available. IT leaders expect their DX projects to provide increased agility, the second most cited benefit, in managing a diverse cloud infrastructure. The next two top benefits are reducing costs, which is likely closely linked with a more agile IT infrastructure, and driving business growth. Advanced technologies like AI and data analytics are the promise of DX, and IT leaders are positioning their organizations to achieve these benefits as they expand their cloud initiatives. Interesting to note is that the least cited expected benefit was restructuring their staffing models. Public cloud infrastructure may have impacts on organizational efficiency, but there are many more compelling benefits that IT initiatives will deliver to the business.

² Note: For more details, see *IaaSView 2019: Worldwide Survey Results* (IDC #US45653819, November 2019).

FIGURE 2

Most Desired Benefits from IT Transformation Initiatives



n = 709

Source: IDC's *Linux in the Public Cloud Survey*, August 2019

Cloud Is Driving New Server Operating System Environment Demands and Requirements

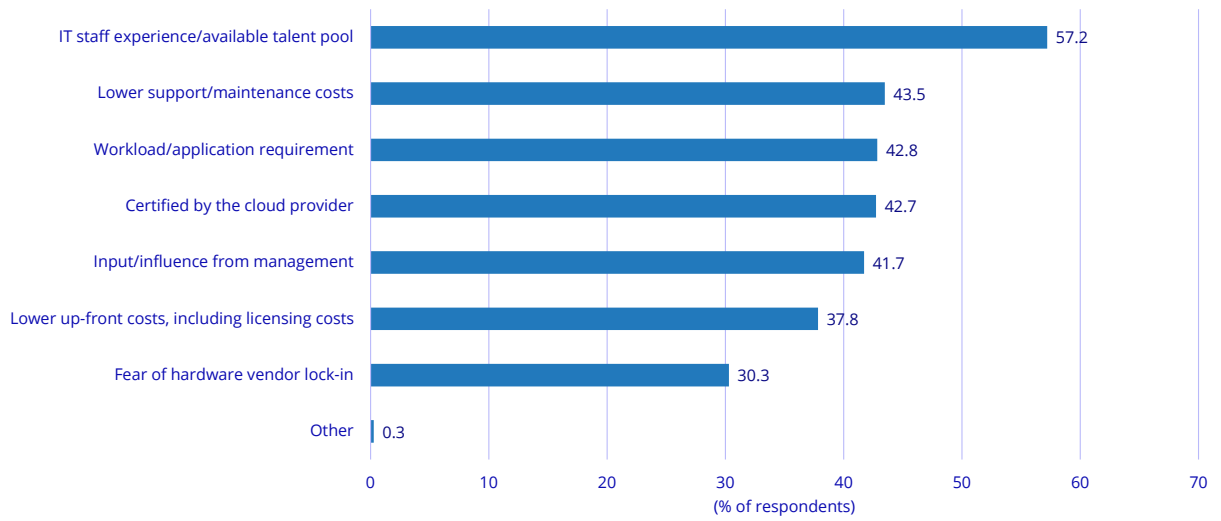
Operating systems are a fundamental component of modern datacenters and provide the platform on which applications can be run. They enable IT to support the business to better compete in the digital economy. A versatile and open operating environment equips IT to support a modern application portfolio.

For IT buyers, the reasons for selecting an OSE are dominated by the available talent pool and experience of IT staff (see Figure 3) and the stability and reliability of the technology (see Figure 4). IT buyers place high value on OSEs that are certified by their cloud providers and that provide robust, enhanced security.

Overall, the S-OSE market is benefiting from the demand for cloud infrastructure – from demand to both run OSE instances in the cloud and build out the cloud. As companies progress with digital transformation initiatives, they are investing in new infrastructure systems, platforms, and technologies. Enterprise cloud migration initiatives and deployments of new applications and workloads in the cloud were key contributors to positive year-over-year S-OSE market growth in 2018, particularly for the Windows Server and commercial Linux market segments. As firms shift their development and production environments into the public cloud, their basic appetite for S-OSE, and particularly Linux, will only increase going forward.

FIGURE 3

Main Business Reasons for Selecting an OSE

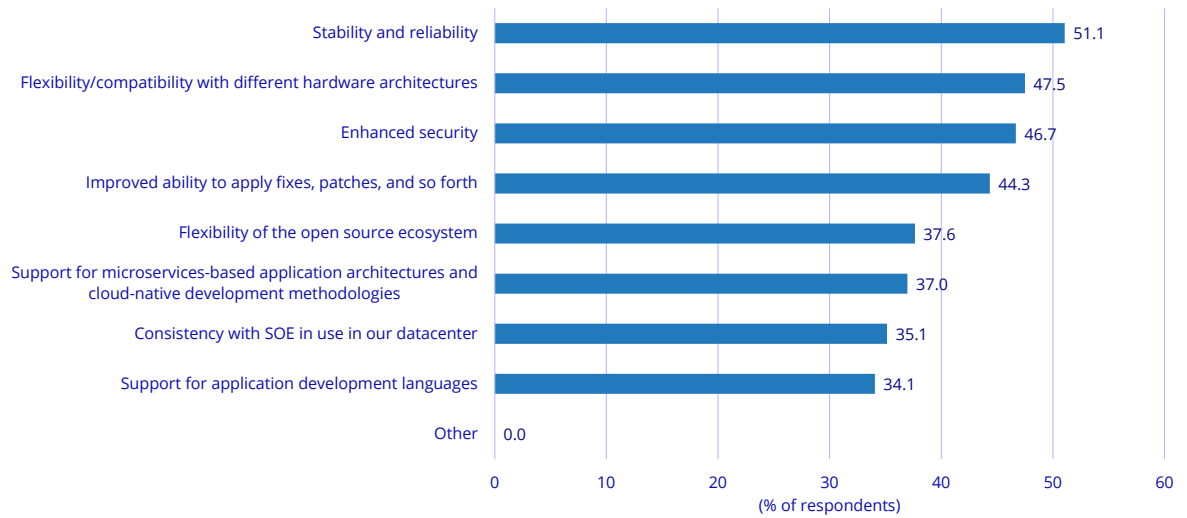


n = 709

Source: IDC's *Linux in the Public Cloud Survey*, August 2019

FIGURE 4

Main Technological Reasons for Selecting an OSE



n = 709

Source: IDC's *Linux in the Public Cloud Survey*, August 2019

S-OSE Selection Can Help Mitigate Challenges with Cloud and DX Initiatives

Driven by DX initiatives, the transition of infrastructure and workflows to the cloud can create friction as established incumbent products are being pushed aside and, often, being outright disrupted by changing stacks of software. Selection of the S-OSE can help mitigate concerns and challenges associated with cloud migration and DX initiatives. While main technological reasons for selecting an OSE are shown in Figure 4, nearly half of the respondents cited the following key reasons for selecting OSEs in the public cloud:

- Stability and reliability
- Flexibility and compatibility with different hardware architectures
- Enhanced security
- Improved ability to apply fixes, patches, and so forth

As previously outlined, Linux is a preferred platform for modern infrastructure, including hosting traditional as well as next-generation applications.

The Linux OS is flexible in terms of the delivery method (i.e., bare metal, virtualized, or containerized) or deployment (i.e., public cloud, private cloud, or traditional IT). Linux can improve IT flexibility and compatibility by providing a common operating platform across different IT infrastructure delivery methods and deployments. More enterprises are choosing commercial supported versions of Linux.

Commercial Linux Is a Leading S-OSE in the Public Cloud Today

The selection of paid commercial Linux subscriptions over freeware versions reveals the importance of certified and stable environments in selecting an OSE (see Figure 5). In terms of overall S-OSE market share combining paid and nonpaid licenses, subscriptions, and deployments (including both cloud and noncloud environments), Linux gained share and accounted for approximately 70% of the total market in 2018, with paid licenses capturing 28.4% share. Windows captured 29.3% of the total market, and other environments, including Unix and other large systems solutions, were held below 0.5% share in total, similar to the past several years. IDC forecasts that Linux will capture 82% of all S-OSE licenses in 2022, with Linux paid licenses growing to 33% of all S-OSE licenses.

Open source S-OSEs, most notably Linux, continue to gain a strong position in commercial accounts and claim share from Microsoft Windows, particularly in terms of primary OSE deployments. Linux is easier to deploy in the virtualized and bare metal environments and, in turn, supports hypervisors as well as container engines natively. These capabilities provide more flexibility and compatibility with different hardware architectures well suited for the migration of COTS or custom application workloads to public cloud infrastructure. In addition, Linux has become a preferred S-OSE in niche environments that include high-performance computing, accelerated computing, massively parallel computing, and big data and analytics workloads environments where absolute (raw) performance is mandatory. Growth in commercial Linux is driven by enterprises running applications on Linux on premises and in the cloud.

Linux continues to align itself with the larger open source ecosystem and has become the foundation for most of the new cloud services, including many of the resources that cloud service providers are making available on their respective clouds. In addition, Linux has become the de facto platform for emerging technologies and use cases like artificial intelligence, massively parallel computing, supercomputing and high-performance computing, edge computing, and embedded non-x86

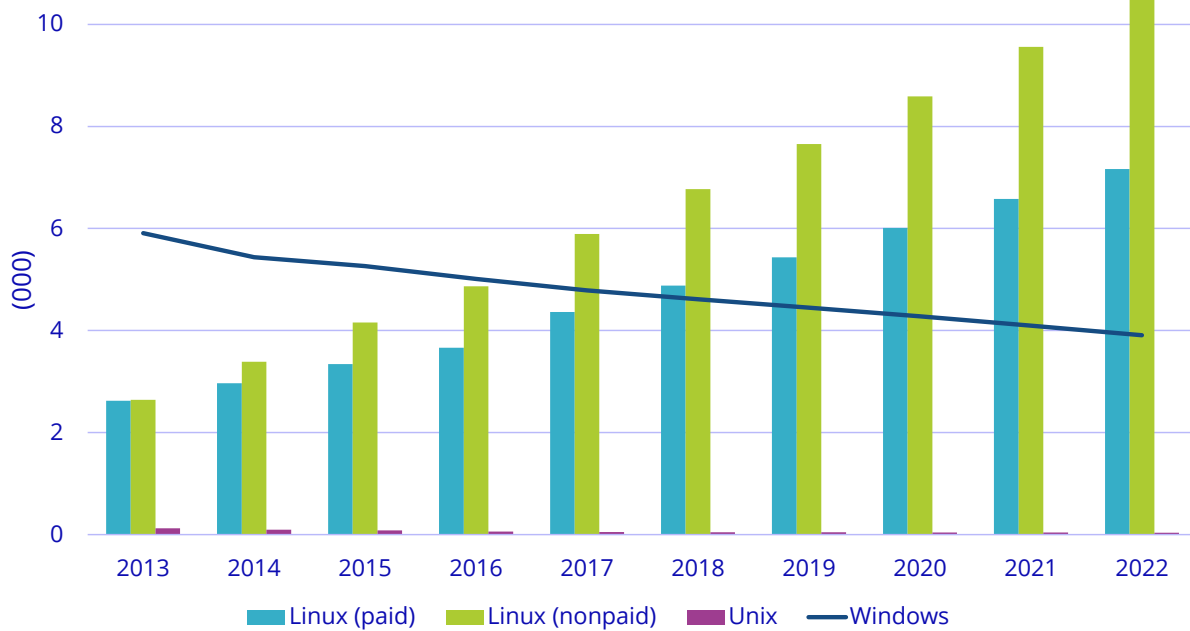
platforms. IDC expects that more enterprises will choose Linux, particularly commercial distros, as they transform and modernize their IT environments.

Linux has become a multiplatform OS with native support for both established and emerging server processor architectures (i.e., x86, ARM, POWER, Sparc, and RISC-V, to name a few), thus making Linux the preferred path for businesses to embrace heterogeneous computing through a common operating platform across both x86- and non-x86-based platforms.

Among the *Linux in the Public Cloud Survey* population, commercial Linux was the most deployed OSE in the public cloud. Linux (both the paid and free versions) makes up 58% of OSEs in place today; of those, two-thirds are paid/commercial Linux and one-third are unpaid or free Linux. Just 15% of the *Linux in the Public Cloud Survey* respondents do not plan to have any commercial Linux deployed in the public cloud by the end of the next two years. Organizations are choosing OSE suppliers that have the skills and expertise needed to be strategic partners to promote success with cloud adoption and DX projects. Nearly all surveyed businesses expect OSE suppliers to have the expertise and capabilities needed to assist cloud migration or adoption projects.

FIGURE 5

Worldwide Server Operating Environments (Cloud and Noncloud) Paid New License Shipments/Subscriptions and Nonpaid Deployments, 2013-2022



Note: For more details, see *Worldwide Server Operating System Environments Forecast, 2018-2022* (IDC #US44376618, October 2018).

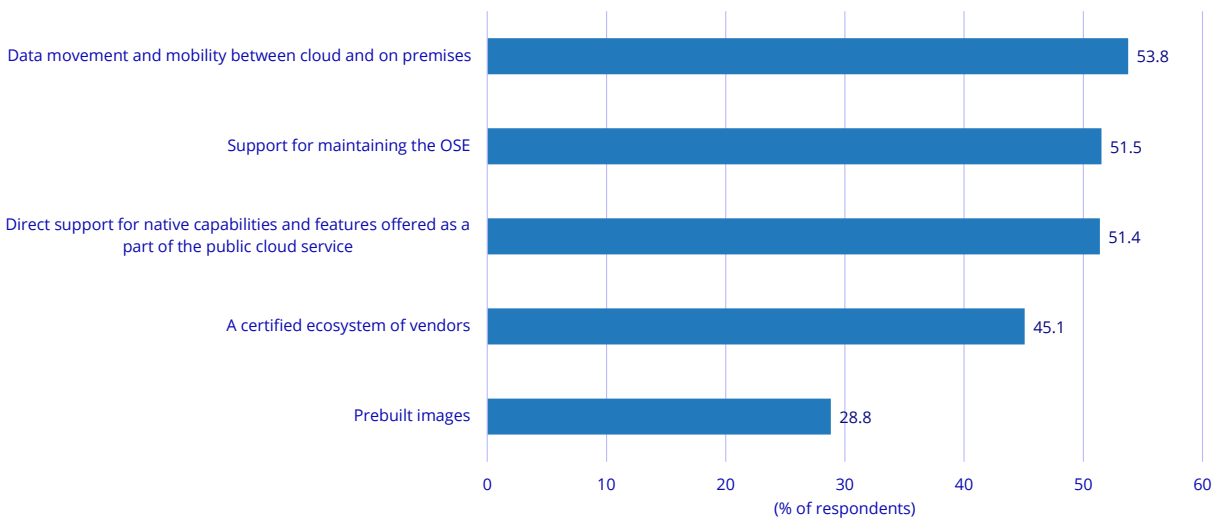
Source: IDC, 2018

IT leaders expect their public cloud service providers to assist with data movement between cloud and on premises, and this was the top response (see Figure 6). This is consistent with Figure 1 and reflects the importance of cross-cloud management and interaction of applications in multicloud environments. Other top responses relate to support – direct support for native capabilities and support for maintaining the OSE – and having a certified ecosystem of vendors. Such an ecosystem is the on-ramp for next-generation applications based on containers and microservices. All these highlight the emphasis and prioritization of hybrid infrastructure and the need for a coherent experience across public and multicloud infrastructure.

FIGURE 6

The Role of Public Cloud Service Provider in the Selection of OSE

Q. What roles do you see the public cloud service provider playing in your selection criteria for the OSE?



n = 709

Source: IDC's *Linux in the Public Cloud Survey*, August 2019

Unpaid Linux

The largest concern about unpaid Linux distributions expressed in IDC's *Linux in the Public Cloud Survey* was security, followed by upkeep of the OSE packages and patches and not having a support staff with sufficient technical expertise. (It is noteworthy that security was not even mentioned as a concern regarding paid/commercial Linux.) The burden of supporting unpaid Linux falls on the user, and this is a significant concern for IT leaders. These results reflect the value organizations place in commercial OSE suppliers that can supplement internal IT staff and expertise.

FUTURE OUTLOOK

Cloud environments are increasingly the default operating environment, and most organizations have adopted the public cloud as a cost-effective platform. IDC believes that over the next five years, cloud platforms and ecosystems will serve as the launchpad for an explosion in the scale and pace of digital innovation. As businesses expand their IT infrastructure, hybrid/multicloud environments will be the de facto approach.

Key Drivers and Benefits of Commercial Linux for Cloud Environments

The future competitive environment for S-OSE is the world of next-generation applications, containers, microservices, and thin operating systems. It is a future of heterogeneous and accelerated computing. IDC sees substantial buildout of infrastructure to support NGAs as the next big opportunity for cloud solution providers and for enterprise datacenters as well. These types of deployments will drive the opportunity for Linux-based technologies moving forward.

IDC believes that Linux has become the default and de facto S-OSE for heterogeneous and accelerated computing architectures used in platforms supporting use cases like artificial intelligence, massively parallel computing, and high-performance computing. Linux is well established as the foundation for modern cloud services and emerging technologies.

Commercial Linux carries the burden of cost, but the benefits of a supported OSE with advanced security and a certified ecosystem of partners bring significant value.

ADVICE FOR THE IT BUYER

Learn from other organizations further along with cloud migration and DX for insights and best practices regarding OSE selection in the public cloud.

Choose S-OSE suppliers and cloud providers that have the skills and expertise needed to be strategic partners to promote success with cloud adoption and DX projects.

Key traits to look for when choosing S-OSE suppliers include the following:

- Commercial enterprise-grade service and support
- Optimizations for both on premises and in the cloud with a proven track record of reliability and scalability
- Support for running applications inside virtual machines, in containers, or in bare metal on any hardware platform
- Support for development tools and frameworks for new-generation applications in the cloud and on premises
- Ability to rapidly deploy patches and updates to increase the security, availability, and reliability of your datacenter
- An extensive network of independent software and hardware vendors that certify their products on S-OSE

LEARN MORE

Related Research

- *Worldwide Server Operating Environments Market Shares, 2018: Overall Market Growth Accelerates* (IDC #US45656619, November 2019)
- *IaaSView 2019: Worldwide Survey Results* (IDC #US45653819, November 2019)
- *Worldwide Public Cloud Infrastructure as a Service Forecast, 2019-2023* (IDC #US44178519, July 2019)
- *Five Phases of Cloud Migration: A Workload-Centric Discussion on Planning Through the Journey* (IDC #US45328519, July 2019)
- *Worldwide Public Cloud Services Spending Forecast to Reach \$210 Billion This Year, According to IDC* (IDC #prUS44891519, February 2019)
- *Worldwide Server Operating System Environments Forecast, 2018-2022* (IDC #US44376618, October 2018)
- *Cloud Repatriation Accelerates in a Multicloud World* (IDC #US44185818, August 2018)
- *Worldwide Operating Systems Market, 2017: Deployment Trends* (IDC #US43775318, May 2018)

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