Enterprise Strategy Group by TechTarget

EXECUTIVE SUMMARY

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From Edge to Cloud: Linux as the Foundation for Modern AI and Cloud-native Environments

Torsten Volk, Principal Analyst

Overview

Linux is the backbone of cloud-native distributed architectures and the platform of choice for running AI/ML workloads. To gain insight into critical enterprise requirements from Linux platforms, TechTarget's Enterprise Strategy Group surveyed 475 IT professionals from enterprise organizations (2,000+ employees) currently using Linux that have influence over the purchase process for data center compute solutions, including operating systems, between August 22, 2024, and September 6, 2024. Organizations represented span North America (United States, Canada, 53%); Western Europe (France, Germany, United Kingdom, 26%); and the Asia-Pacific region (China, Japan, South Korea, 21%). This summary focuses on the 10 key Linux platform-related organizational requirements uncovered from the research.

Common Disruptions Making Organizations Think About Changing Their Linux Strategy

Compatibility and integration issues, the need to innovate faster, performance issues, high current licensing or subscription fees, security vulnerabilities or slow patch releases, and a desire to be more compliant with industry compliance standards are the six most common reasons organizations change Linux vendors.

There are six key reasons organizations report changing Linux vendors: compatibility and integration issues, the need to innovate faster, performance issues, high current licensing or subscription fees, security vulnerabilities or slow patch releases, and a desire to be more compliant with industry standards. However, organizations should not take changing out Linux vendors lightly. Concerns about migration costs, operational risks, and integration with existing infrastructure often slow down these transitions. For a new distribution to be a viable choice, it must provide a straightforward, reliable migration path and fully support the organization's existing applications, security standards, compliance needs, and infrastructure. Most organizations use multiple Linux vendors, which enables a phased transition that simplifies the adoption of a new distribution while gradually retiring an existing one.

The Expanding Need for Robust Linux Devices Across Preferred Deployment Environments

Seventy-six percent of respondents reported that their organization uses Linux for commercial deployments in embedded devices, while 35% plan to use Linux for commercial deployments in remote data center servers, and 34% plan to use Linux for commercial deployments on edge servers. This trend underscores the increasing demand for rugged Linux hardware capable of withstanding harsh and unpredictable conditions. In edge and embedded environments, where devices often operate outdoors, in remote locations, or under extreme temperatures, Linux's adaptability, paired with ruggedized hardware, provides the reliability needed for continuous operation. As organizations deploy Linux across these challenging environments, robust, durable devices become essential to ensure stability and resilience in critical applications.

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Flexibility Is King: Enabling Hardware Choice With Customizable Linux Platforms

The high adoption of custom Linux platforms drives the need for flexibility, as organizations aim to deploy Linux across a wide array of hardware types to match specific operational requirements, from rugged edge devices to high-performance servers. In fact, 69% of organizations require Linux support for custom server hardware. X86/Intel (66%) and ARM (50%) are the most widely used CPU architectures that require Linux OS support, but many organizations also rely on Linux support for less common processors like RH850 (25%), MIPS (31%), RISC-V (36%), and PowerPC (43%). This diversity underscores the need for a highly adaptable, right-sized Linux platform that can support varied hardware requirements and maximize operational flexibility.

Tuning for Specific Use Cases: Optimizing Performance and Workload Efficiency

For 77% of organizations, performance tuning is an essential pre-deployment step for Linux updates to ensure systems are configured precisely for their intended workloads. In addition, 91% consider performance critical or important to operations, with 52% prioritizing performance due to the need to meet service-level agreements (SLAs) and 39% for operational efficiency. Moreover, when asked about which factors are most important to their organization when considering the use of application containers, 63% of respondents cited performance and resource efficiency, highlighting the importance of aligning system configuration with specific workload demands.

Seamless Workload Deployment: Achieving Consistent Operations From Edge to Cloud

Eighty-nine percent of organizations agreed that they value the ability of their Linux systems to efficiently operate between edge and cloud environments, reflecting the growing demand for hybrid architectures. Organizations need the flexibility to deploy the same code seamlessly across diverse workloads and locations without requiring re-certification. This approach ensures optimal resource usage, low latency, consistent operations management, and robust security. Scalability is a key factor, valued by 47% of respondents, including 57% of C-level executives, who emphasize the importance of scaling operations to adapt to evolving business needs.

89% of organizations agreed that they value the ability of their Linux systems to efficiently operate between edge and cloud environments.

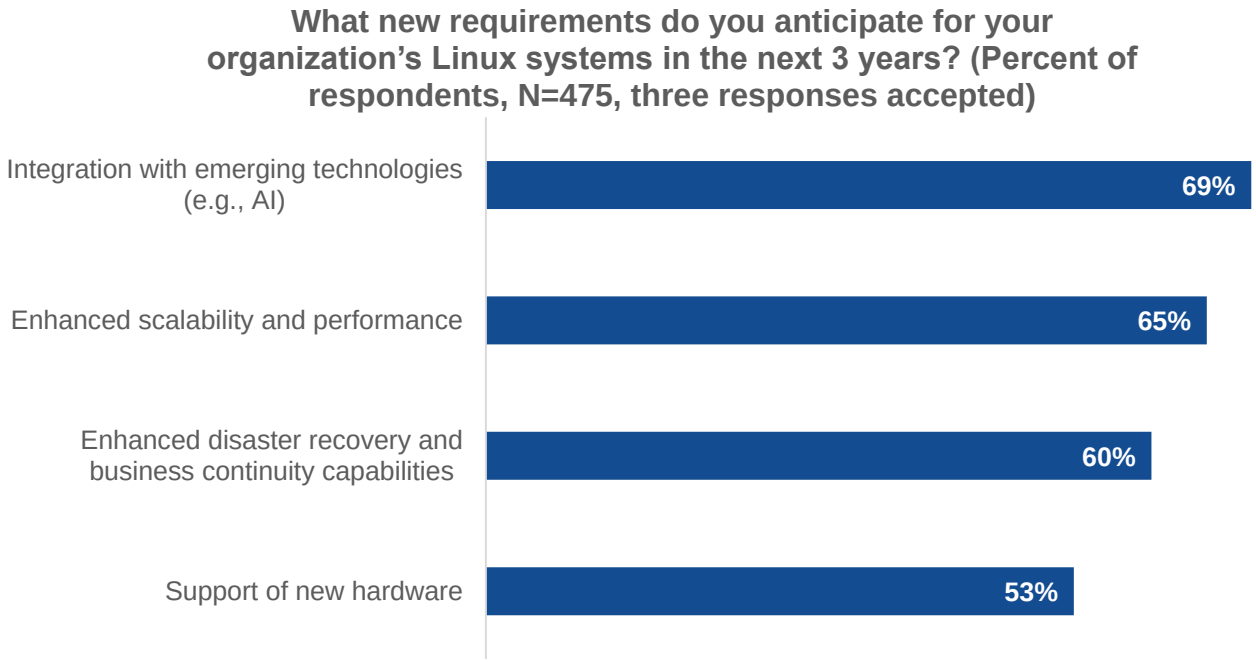
Nontraditional Data Centers: The New Norm for Modern Applications

Ninety-five percent of organizations are developing applications that are deployed outside of traditional data centers, spanning public clouds, regional data centers, and far-edge or intelligent-edge environments. This shift underscores the hybrid and distributed architecture of today's applications, where data and workloads must be processed across diverse environments from cloud to edge. Thirty-nine percent of organizations are connecting data sources across these locations, managing a range of data types—including databases, sensor data, text, images, and video—to support modern operational demands.

Cloud-native Workloads on Linux: The Foundation for AI Innovation

With 83% of organizations currently leveraging cloud-native technologies like Kubernetes for container orchestration and 80% having adopted AI, Linux has become the backbone of modern enterprise infrastructure. As a result, 65% anticipate that their organization's Linux distribution will require enhanced scalability and performance within the next three years (see Figure 1), likely to help support their emerging AI workloads. This highlights the critical role of Linux in managing AI processing as a key success factor for scaling enterprise-level AI initiatives.

Figure 1. Linux Needs to Seamlessly Integrate With AI/ML Technologies



Source: Enterprise Strategy Group, a division of TechTarget, Inc.

Secured and Supported: Linux's Commitment to Enterprise Needs

Eighty-two percent of organizations require SLAs with their Linux vendor to ensure guaranteed support response times, defined performance metrics, and compliance with security and regulatory standards, with 92% having a long-term support contract in place. At the same time, only 16% of organizations can address critical Linux vulnerabilities within 24 hours. As a result, nearly two-thirds of organizations plan to implement additional security and compliance measures within the next year. Therefore, Linux platforms that offer Federal Information Processing Standards compliance, full-disk encryption, Security Technical Implementation Guide compliance, and long-term support contracts will be well positioned to meet these evolving needs.

Diverse and Mission-critical Workloads Drive Linux Adoption

Linux's versatility supports a wide range of critical workloads, with 61% of organizations using it for enterprise database management and 60% for virtualization environments. Additionally, over half (56%) leverage Linux for security-related applications, such as intrusion detection and encryption, highlighting Linux's reliability in handling sensitive enterprise tasks. This capability to support diverse, mission-critical workloads reinforces Linux as a trusted platform across various enterprise environments.

Proactive OS Lifecycle Management Ensures Stability and Performance

Organizations recognize the importance of proactive lifecycle management to maintain stability and performance across Linux environments. On average, they refresh or update their Linux OS every 9 months, with 51% doing so in under six months. This frequent updating cycle emphasizes the commitment to keeping Linux systems optimized and responsive to changing business needs, ensuring ongoing reliability and performance across distributed environments.

Conclusion

A right-sized yet flexible Linux platform is the preferred choice for organizations looking to modernize their application environments across data centers, public clouds, regional clouds, and edge locations. With workloads becoming more diverse and distributed, and with emerging AI requirements putting pressure on IT operations, organizations expect their Linux vendors to deliver the basics flawlessly. A Linux distribution must adapt seamlessly to both greenfield and brownfield environments, ensuring strong performance, resilience, and security across all deployment scenarios. Given the mission-critical nature of Linux workloads, organizations seek a reliable vendor that supports these requirements and facilitates customization. Linux, thus, supports more mission-critical workloads than ever before, making it indispensable to modern IT infrastructure.

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contact@esg-global.com
www.esg-global.com