

# Linux in the hybrid cloud: Building with digital Lego blocks

Linux, the flexible backbone of the hybrid cloud, combines modularity, security, and cost-efficiency to power modern enterprises' digital transformation



BY PRATIMA HARIGUNANI

**W**hat if Lego Blocks and Slime Clay got married? Would things get more fun, easier to make-break-repeat, fluid, more creative, and more DIYish?

We could not ask this directly from those toying with new technology frontiers in the cloud playground, so we ask another version of this question: Is Linux a match made for the hybrid cloud?

Before we tell you what we heard, let us first get the 'hybrid' part out of the way. Of course, any cloud, by design, needs to be easy to build, with as much modularity as an OS like Linux can provide. But hybrid cloud is a special stripe here. It requires more flexible brickwork on IT and an even more fluid shaft to ship and arrange all the workload furniture. After all, you need to bring in both the control and security strengths of a private cloud and the cost economics and elasticity of a public cloud.

The question is whether Linux is a square peg in the square hole of a hybrid cloud.

## THE LINUX TUX: FOR THE HYBRID PARTY

The question has become more relevant today than ever. It is not just hybrid cloud's terra firma but also its need for an easily configurable IT ecology that is expanding with a new frenzy.

As per the Cloud Native Computing Foundation's Annual Survey 2023 with Linux Foundation LF Research (that focused on organisations that are not in the cloud business but had a potential or actual reason to consume cloud services), it was seen that large organisations are drawn to all cloud types (public, private, and hybrid) but are the primary consumers of hybrid clouds (56%) compared to medium (44%) and small (27%) organisations. Interestingly, multi-cloud solutions (hybrid and other cloud combinations) were also noted to be used by 56% of organisations.



“Whether through open-source or commercially supported distributions, Linux provides the necessary tools and support for successful hybrid cloud strategies.”

**RUDRAKSH KHANDELWAL**

Senior Specialist, Cloud and DevOps, Publicis Sapient

Linux plays a significant role in hybrid cloud setups because it provides a stable, consistent and flexible platform for running applications across different environments—on-premises, private or public clouds, nails Devroop Dhar, Co-Founder and MD, Primus Partners. “Hybrid clouds need smooth integration between on-site data centres and cloud services, and Linux’s wide adoption makes it easier to move workloads around without compatibility issues.”

Arvind Purushothaman, Cloud Leader, Technology Consulting, EY Global Delivery Services, says Linux is essential for hybrid cloud confidence due to its flexibility and compatibility with major cloud providers.

Linux is also distinctively apt for the boxes it ticks on connectivity, interoperability and container compatibility.

“Its robust security capabilities make it a solid choice for managing infrastructure resources securely across both on-premises and public cloud environments. The flexibility of Linux allows it to be deployed seamlessly across various servers, ensuring smooth connectivity and interoperability, which is crucial for hybrid cloud management,” adds Rudraksh Khandelwal, Senior Specialist, Cloud and DevOps, Publicis Sapient.

Linux’s native support for containerisation technologies is critical for developing and managing scalable applications in a hybrid cloud setup. Linux’s cost efficiency, open-source nature, and available commercial support options make it a budget-friendly choice for enterprises. It removes the burden of licensing fees and offers a broad range of tools and resources.

It is not a coincidence that approximately 62% of servers globally run some flavour of Linux, highlighting its reliability and widespread adoption in server environments. “Thus, whether through open-source or commercially supported distributions, Linux provides the necessary tools and support for successful hybrid cloud strategies.” Khandelwal maintains.

Okay, so does that mean that even vanilla Linux works, or does Enterprise Linux get the upper hand over its Community Linux sibling, especially when one is using this horse to pull a hybrid-cloud cart?

The answer boils down to what lies in the cart: critical workloads or DIY stuff. And do you need the cart to go in reverse gear? Yes, one has to prepare well for cloud repatriation scenarios, too.

As Purushothaman says, Community Linux is preferred in use cases like development, testing, or non-critical workloads where cost efficiency and innovation are critical. “It is ideal for teams that can manage their support and are comfortable with some potential instability.”

However, Enterprise Linux is preferred for critical workloads, production environments, and large-scale deployments. “It offers long-term support, regular updates, and enhanced security, enabling compliance and minimising risks. Enterprise Linux is the choice for organisations requiring reliability and robust support in their hybrid cloud strategy.” Purushothaman spells out.

Here is a deeper drill-down offered by Marshal Correia, Vice President and General Manager, Red Hat India and South Asia. “Red Hat Enterprise Linux (RHEL) differs significantly from Community Linux distributions, like Fedora, in several ways. While Linux itself is open source and accessible for anyone to use, modify, and distribute, enterprise distributions are specifically designed to meet the needs of businesses. For example, RHEL provides a 10-year life cycle support compared to Fedora’s two-year support cycle. This longer support period ensures the stability and reliability that businesses require.”

Correia also contends that RHEL undergoes extensive testing, performance optimisation, and proactive security assessments. “A dedicated security team continuously monitors for vulnerabilities, providing timely alerts and



“As cloud repatriation becomes a trend, Enterprise Linux helps businesses maintain security, performance, and compliance in complex cloud strategies.”

**ARVIND PURUSHOTHAMAN**

Cloud Leader, Technology Consulting, EY Global Delivery Services



## IN BRIEF

- **Hybrid Cloud needs flexibility:** Linux’s modular design makes it a perfect fit for the fluid nature of hybrid cloud environments.
- **Smooth integration:** Linux ensures seamless connectivity between on-premises data centres and public clouds, avoiding compatibility issues.
- **Cost efficiency:** With no licensing fees and open-source support, Linux provides a budget-friendly option for enterprises, especially in hybrid setups.
- **Enterprise Vs. Community Linux:** For critical workloads, Enterprise Linux offers long-term support, enhanced security, and reliability over Community versions.
- **Cloud repatriation:** Linux, particularly Enterprise Linux, is key for smooth transitions between cloud and on-premise systems, ensuring compliance and performance.
- **Hyperscalers back Linux:** With support from Oracle, Nutanix, and IBM, Linux continues to expand in hybrid cloud environments, offering integration and scalability.

guidance to address security concerns. While some companies might opt for free Linux distributions during the development phase of cloud services, RHEL has greater advantages for those looking to scale their deployments or ensure a uniform experience across both on-premises and cloud environments. The benefits include enhanced security, robust support, broader integration with partner ecosystems, and enforceable service-level agreements (SLAs). These features are essential for building a strong foundation for future cloud deployments.”

Dhar chimes in and explains how Community versions sometimes lack enterprise-grade security patches, SLAs, and extended lifecycle support—things enterprises heavily depend on. “Enterprise Linux such as RHEL and SUSE Linux Enterprise Server are built to meet the demands of large organisations. Their features ensure enterprises can run their applications without worrying about compatibility, security risks or unsupported software.”

Khandelwal avers here, highlighting the aspects of consistency and cloud migration that become accentuated for hybrid clouds. “Enterprise Linux ensures consistent performance across both on-premises and cloud environments. Its uniform behaviour allows IT teams to easily manage workloads, whether running on data centre hardware or cloud virtual machines. This consistency helps to alleviate the complexities associated with customised server management and enables IT professionals to concentrate on delivering value to customers.”

As he further explains, this matters a lot for migration: “For cloud migration, Enterprise Linux offers optimised cloud images specifically tailored for different cloud providers. These pre-configured images, developed through partnerships with third-party software vendors, expedite cloud adoption and simplify the onboarding of enterprise applications.”

Khandelwal opines that troubleshooting and optimisation also have stark benefits, whether



“OpenShift has become a go-to platform for enterprises adopting Kubernetes and looking for a seamless way to manage containers in hybrid clouds.”

**DEVROOP DHAR**

Co-Founder and MD, Primus Partners

moving to the cloud or repatriating workloads to on-premises systems.

Yes, cloud repatriation is complex and ironic, but it is also a stark reality that enterprises cannot ignore.

Purushothaman affirms that as cloud repatriation becomes a trend, Enterprise Linux facilitates a smooth transition back to on-premise infrastructure while maintaining security, performance, and compliance, making it an essential asset for organisations navigating complex cloud strategies.

Dhar also underlines that enterprise-level agility is critical now, as many companies consider cloud repatriation—moving workloads back from public clouds to their data centres—to control costs, ensure data privacy, or improve performance.

As businesses increasingly consider cloud repatriation, RHEL offers the flexibility to migrate workloads across infrastructure, asserts Correia. “This adaptability helps businesses optimise costs, maintain control over critical data, and meet regulatory requirements.”

Okay, we understand by now. Linux, especially Enterprise Linux, is an excellent choice for someone who wants to settle seriously with a hybrid cloud.

What is fascinating to note now is that it is not just ‘any’ Linux, but Linux that has become poised, fortified, refined and groomed for modern enterprises. More so, with hyperscalers and players like Oracle, Nutanix, and IBM putting their weight behind Enterprise Linux.

But is that anything more than gilding the lily? Oops, Linux?

### LINUX IS NOW LUXE

Yes, it matters significantly that hyperscalers and major players like Oracle, Nutanix, and IBM are backing



### ENTERPRISE LINUX ADVANTAGES

- Consistent performance essential for Hybrid Cloud IT management
- Supports workload migration, application interoperability, and agility
- Professional support services, including migration planning assistance
- Advanced tools and integrations like Convert2RHEL and SELinux, with enterprise solutions like Ansible and OpenShift
- Reliable security patches, regular updates, kernel stability, and a clear version roadmap
- Simplifies migration processes and ensures secure operations across diverse environments
- Relevant for scenarios involving cloud repatriation
- Certified software stacks ensure seamless application interoperability
- Reduces compatibility issues during migration
- Key features include containers, automated patching, and compliance tools



“RHEL provides a secure, efficient foundation that supports innovation across physical, virtualised, hybrid cloud, multi cloud, and edge infrastructures.”

**MARSHAL CORREIA**

Vice President and General Manager, Red Hat India and South Asia

Enterprise Linux, opines Purushothaman. “Their support underscores the importance of a stable, secure, and scalable platform that meets the stringent demands of modern enterprises. These industry leaders endorsing Enterprise Linux affirms broader compatibility, seamless integration, and strong support across various ecosystems.”

Integrating Enterprise Linux with hyperscalers’ platforms facilitates smoother interoperability and better resource management, Khandelwal reckons. “This integration streamlines IT operations, making it easier for enterprises to optimise their infrastructure across cloud and on-premises environments. Plus, the range of options provided by different hyperscalers offers enterprises flexibility in choosing solutions that best meet their needs. This variety fosters competitive advantages by allowing organisations to select the most suitable and cost-effective solutions for their specific requirements.”

Let us ask this question from Red Hat as well.

The strong support for Red Hat Enterprise Linux from major tech players like Oracle, Nutanix, and IBM signifies a significant shift in the enterprise IT landscape, shares Correia. “This endorsement highlights Enterprise Linux’s growing recognition as a reliable, scalable, and secure platform for critical workloads. As the cornerstone of Red Hat’s open hybrid cloud strategy, RHEL benefits from this industry validation, enhancing its credibility and adoption.”

He unravels how, for businesses, this means access to a wide range of optimised tools, platforms, and services that ensure superior performance, interoperability, and support. “For example, IBM LinuxONE Express demonstrates how Enterprise Linux can be paired with IBM’s hardware innovations to deliver exceptional efficiency and resilience.”

Also, as Purushothaman reasons, this backing brings enterprise-grade features such as enhanced

security, compliance, high availability, and robust performance. “This collective endorsement gives enterprises confidence in choosing Enterprise Linux for their critical workloads, ensuring reliability, compliance, and long-term viability across cloud and on-premises environments.”

The technical advancements and innovations driven by hyperscalers contribute to developing new features, improved performance, and enhanced security within Enterprise Linux distributions, Khandelwal feels likewise. “Not to forget, strategic partnerships between hyperscalers and OS/software vendors, such as those involving Oracle, Nutanix, and IBM, enrich the Enterprise Linux ecosystem.

Impressive! So, what about the OG brigade? What are players like Red Hat and SUSE doing right, or are they not? Especially with the latest pony in this ring from that side: the announcement of RHEL 9.4?

### **LINUX’S NEW PUCKS**

Two major names dominate the organic side of Linux. Red Hat and SUSE.

Red Hat is doing well by focusing on hybrid cloud, automation (Ansible) and container management (OpenShift), explains Dhar. “On the other hand, SUSE is known for flexibility and openness, appealing to those who value a more community-driven approach. Their tools, like SUSE Manager and Rancher (for Kubernetes), are gaining traction. However, Red Hat remains dominant in this space and has significant market presence and reach.”

With RHEL 9.4, Red Hat has introduced enhancements like improved container security, optimised resource management, and streamlined automation with updated Ansible content, reinforcing its leadership in enterprise Linux, Purushothaman points out. “Red Hat and SUSE, while both powerful, offer distinct environments. Red Hat



Linux's open-source flexibility, paired with enterprise-grade support, gives businesses the agility needed to scale hybrid cloud environments.

focuses on stability and broad support for architectures like AMD, Intel, Arm, IBM Power, and IBM Z. SUSE. Conversely, it emphasises flexibility, supporting similar architectures, including unique platforms like Raspberry Pi and IBM LinuxOne.”

Purushothaman also points out that both vendors go beyond just offering Linux distributions; they provide comprehensive support packages, management tools, cloud services, and container hosting.

And with RHEL 9.4, the Enterprise Linux pot has been stirred in a big way.

As Correia claims, “Red Hat Enterprise Linux 9.4 brings notable improvements to help businesses navigate the complexities of hybrid cloud computing and an increasingly AI-driven world. This latest version enhances management and automation features, making building and maintaining standard operating environments (SOEs) in distributed systems easier. A standout feature in RHEL 9.4 is the proactive guidance from Red Hat Insights, which will soon provide recommendations for creating SOE images. The new system roles extend automation capabilities, including edge support and automated application control, making operations smoother and more efficient. RHEL 9.4 also delivers a reliable and secure platform for developing innovative applications, supporting consistent performance across physical, virtual, cloud, and edge environments.”

Dissecting RHEL 9.4, Khandelwal observes a critical update- including virtualisation support for 64-bit ARM servers alongside existing support for x86 and IBM Z architectures. “This broadens hardware choices for enterprises, allowing them to deploy critical applications and services on the most suitable processor architecture for each workload. The improved performance and stability of RHEL 9.4 also benefit AI workloads, supporting popular frameworks like TensorFlow and PyTorch and including optimised drivers and libraries for HPC environments. Additionally, the recent introduction of RHEL AI provides a developer preview of an optimised bootable RHEL image with an open-source large language model (LLM) and related tools, streamlining the development of AI-driven enterprise applications.”

He maintains that players like Red Hat, SUSE, and Oracle are refining their server and workload management solutions to simplify operations across on-premises, hybrid, and multi-cloud environments.

Does that also mean that huddles like OpenShift and OpenELA matter for enterprises?

Yes, Purushothaman says. “OpenShift, Red Hat's enterprise Kubernetes platform, is crucial for enterprises seeking to deploy, manage, and scale containerised applications. Open Enterprise Linux Association (OpenELA) represents a collaborative effort to develop and maintain a stable, open-source enterprise Linux distribution. Both OpenShift and OpenELA are vital in modernising IT infrastructure, improving agility, and supporting complex, multi-cloud environments, making them significant for enterprises looking to stay competitive and adaptable in a rapidly evolving technological landscape.”

Tools such as OpenShift, OpenELA, and others play a crucial role in this effort by providing open-source flexibility combined with professional support, Khandelwal weighs in. “This approach allows enterprises to select solutions that best match their budget and application requirements.”

Dhar adds that OpenShift has become a go-to platform for enterprises adopting Kubernetes and looking for a seamless way to manage containers in hybrid clouds. “OpenELA is a newer initiative to ensure alternatives remain available after RHEL's subscription changes. These initiatives offer choice and stability for enterprises, which are critical in today's rapidly changing cloud landscape.”

Dhar also cautions that Red Hat's move to shift CentOS towards a more restricted, subscription-focused RHEL model may disappoint many in the community and smaller businesses, leading to concerns and dissatisfaction within their ecosystem.

#### WHAT ABOUT THE SECURITY HORCRUX?

If Linux grows in its cloud terra-firma, this also expands the attack soil for bad actors.

## Cloud repatriation is a growing trend, and Linux plays a vital role in ensuring a smooth, secure transition back to on-premises infrastructures.

Linux's vulnerability has been exposed repeatedly through attacks and threat-industry reports. According to recent media reports, a new crypto jacking campaign distributing Linux malware has targeted misconfigured Confluence, Apache Hadoop, Redis, and Docker servers. Here, vulnerable Internet-exposed cloud servers were identified and exploited through four novel Golang payloads, as shared in a Cado Security report.

The researchers stressed how such attacks indicate the extensive initial access methods for Linux and cloud malware. Earlier in 2023, the operators of the Kinsing malware were reported to be targeting cloud environments with systems vulnerable to 'Looney Tunables', a Linux security issue related to root privileges on the system. Even before that, in 2022, a report from VMware's Threat Analysis Unit talked about malicious actors using malware to target Linux-based operating systems and cyber criminals adding malware that targets Linux-based operating systems to their attack toolkit.

Things get even more muddy when we look at the recent big security Blackout—the Crowdstrike event, where 'kernel panic' was associated with the Falcon sensor. Also, the OpenSSH bug raised many security concerns in this part of the IT world.

Correia argues that there is a distinction between the widespread CrowdStrike outage (the impact of which was limited to Windows systems) and a 4 June bug report related to Falcon sensors causing a potential kernel panic on Linux systems. "It is not an apples-to-apples comparison with the two events, and it is unclear if they are related, given the significant differences between core Windows and Linux functionality."

"Red Hat Product Security rated the most recent OpenSSH bug (CVE-2024-6387) Important. This means that we recommend organisations patch all affected systems, even though the race condition that the CVE produces cannot be reliably exploited. This is due to RHEL and OpenShift having ExecShield enabled by default, along with NX technology. This combination forces attackers to retry the exploit thousands of times, creating significant system 'noise', leading to faster detection, disruption and mitigation of potential breaches," he delineates.

However, these events warrant attention from other industry experts. The CrowdStrike event, where a 'kernel panic' was associated with the Falcon sensor, highlights the critical importance of affirming that security tools are thoroughly tested for compatibility with the underlying operating system, particularly in environments running enterprise Linux distributions, concurs Purushothaman. "Kernel panics can disrupt operations, leading to system downtime and potential data loss. Organisations should regularly update and test their security solutions to prevent such issues and ensure they don't compromise system stability."

Security is a big concern, agrees Dhar. "These events highlight why enterprises need Linux distributions with robust, proactive security measures, quick patch management and enterprise-grade support. Having an Enterprise Linux distribution in place means having a team ready to respond quickly, reducing risks that could otherwise disrupt operations."

The recent OpenSSH bug underscores ongoing security challenges, says Purushothaman. "OpenSSH is widely used for secure communication in Linux environments, and vulnerabilities can expose enterprises to significant risks, such as unauthorised access or data breaches. Organisations must apply security patches and maintain rigorous monitoring practices promptly."

As accentuated in an IDC Cloud Pulse Report, Security remains paramount. Concerns around managing risk, downtime, performance and application availability will also guide many decisions, from where the cloud lives to what technologies and services are consumed. Enterprise Linux has a role to play here, offering cloud-ready options with dedicated services to help protect companies in the cloud as they scale, it stated.

Khandelwal, however, emphasises that no software is perfect, and operating systems are no exception, "As they advance in robustness and security, they still face challenges despite being used globally. IT ecosystems will inevitably encounter disruptions, outages, and losses due to various factors. Therefore, enterprises must design their IT infrastructure with resilience in mind."

## Hybrid cloud is not just about flexibility—Linux brings the modular architecture required to build, manage, and innovate in complex cloud ecosystems.

He also reminds that contracts with software providers often include clauses that guarantee specific uptime levels and outline remedial actions if these standards are unmet. “This provides an additional layer of protection and support in the event of system failures, such as Blue Screen of Death errors or OpenSSH issues.”

Correia adds, “RHEL 9.4 improves security management by allowing more control over cryptographic policies and messaging authentication codes for SSH. These updates reflect Red Hat’s dedication to simplifying Linux adoption and enhancing its scalability for modern hybrid cloud needs.”

### PRICING: A NEW ROW OF DUCKS

With all the modularity, flexibility, ease, and cloud-native IT fluency that Enterprise Linux promises, it may face new challenges and concerns on the costs side, especially after the industry impact from pricing and bundle changes made by VMware.

Enterprise Linux remains a vital component of IT infrastructure, even as the industry navigates the impact of VMware’s pricing and bundle changes. Khandelwal dismisses this spillover risk: “While VMware’s adjustments may increase costs or alter the value proposition of its virtualisation and cloud offerings, Enterprise Linux continues to provide a flexible, cost-effective, and open-source alternative for managing workloads.”

Following Broadcom’s acquisition of VMware, the company discontinued perpetual licenses and transitioned to a subscription model. Additionally, VMware has restructured its product offerings, eliminating half of its previous solutions and consolidating the remaining into two main bundles. This restructuring has led to a substantial increase in costs for existing VMware customers, with expenses rising 5–12 times, avows Purushothaman.

What is likely now is that many organisations may shift to other virtualisation solutions while retaining their current operating systems, he augurs. “For those using Enterprise Linux, this could mean continued deployment, leading to no net change in the number of Enterprise Linux servers. Also, customers might choose hybrid or multi-cloud environments that better align with their budget and needs. Enterprise Linux distributions, known for

their robust support across various cloud platforms and seamless integration, may become increasingly attractive.”

It could just be the ribbon bow that this box needed. Khandelwal elucidates that Enterprise Linux is often favoured for its ability to run on various hardware and integrate with different cloud environments, providing organisations the flexibility to avoid vendor lock-in.

“As VMware’s changes push some enterprises to reevaluate their infrastructure strategies, many are turning to Enterprise Linux to maintain control over costs, optimise performance, and reaffirm its compatibility across diverse environments. This adaptability enables Enterprise Linux to remain a key player in the evolving landscape of enterprise IT, providing stability and continuity amidst changes in the broader ecosystem.”

Purushothaman also professes that enterprise Linux vendors will likely strengthen their partnerships with other virtualisation and cloud providers to offer more competitive solutions. In either scenario, the number of servers running Enterprise Linux is expected to rise, enhancing its presence following Broadcom’s acquisition of VMware.

VMware’s recent changes in pricing and bundling have made enterprises rethink their IT strategies, Dhar echoes. “Many organisations now consider Enterprise Linux a more flexible and cost-effective option. Enterprise Linux providers like Red Hat and SUSE are responding with more attractive pricing, enhanced support and deeper cloud-native integrations, making them more appealing for organisations seeking flexibility and cost control.”

With hybrid cloud gathering steam, new Linux-related needs gaining ground in the enterprise segment, and new scenarios on the security and pricing front, Linux could be so much more than an IT maquette or a cloud dollhouse. It could bring in much more than modularity, flexibility, and ease of configuration.

This could be just the time to ask the next question. What happens when Rainbow Loom marries Slime Clay? 🧡

*pratimah@cybermedia.co.in*