RED HAT®
ENTERPRISE LINUX®

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WHAT'S NEW IN RED HAT ENTERPRISE LINUX 7.4

TECHNOLOGY OVERVIEW

BENEFITS FOR:

- Architects
- System administrators
- Developers

NEW FUNCTIONALITY IN:

- Linux containers
- Management and automation
- Multiplatform support / partner ecosystem
- Security
- Performance

INTRODUCTION

Red Hat® Enterprise Linux® 7.4, the latest version of the world's leading enterprise Linux platform, offers new automation capabilities designed to limit IT complexity while enhancing workload security and performance for traditional and cloud-native applications. This provides a powerful, flexible operating system backbone to address enterprise IT needs across physical servers, virtual machines, and hybrid, public, and multicloud footprints.

Architects: Red Hat Enterprise Linux 7 is ready for whatever infrastructure choices you make, efficiently integrating with other operating environments, authentication standards, and management systems. Whether your primary goal is to build network-intensive applications, massively scalable data repositories, or a build-once-deploy-often solution that performs well in physical, virtual, and cloud environments, Red Hat Enterprise Linux 7 includes functionality to support your project.

System administrators: Red Hat Enterprise Linux 7 has new features that help you do your job better. You'll have better insights into what the system is doing and more controls to optimize it, with unified management tools and system-wide resource management to reduce the administrative burden. Container-based isolation and enhanced performance tools allow you to see and adjust resource allocation for each application. And, of course, there are continued improvements to scalability, reliability, and security.

Developers: Red Hat Enterprise Linux 7 is more than just an operating system; it provides a rich application infrastructure with built-in mechanisms for security, identity management, resource allocation, and performance optimization. In addition to well-tuned default behaviors, you can take advantage of controls for application resources instead of leaving performance up to chance. Red Hat Enterprise Linux 7 includes access to current versions of the most in-demand programming languages, databases, and runtime environments.

FEATURES AND ENHANCEMENTS

The following sections include additional information on new features and enhancements as they relate to Linux containers, security, performance, reliability, and more.

LINUX CONTAINERS

Linux containers present an evolution in how businesses develop, deploy, and manage modern applications, helping enterprises scale to new levels of operational efficiency, speed application development, and increase flexibility in managing application life cycles. To further accelerate application development, businesses are turning to platforms designed to support Linux container technology, including Red Hat Enterprise Linux, Red Hat Enterprise Linux Atomic Host, and Red Hat OpenShift.

Red Hat Enterprise Linux 7 implements Linux containers using core technologies such as control groups (cGroups) for resource management, Linux namespaces for process isolation, and Security-Enhanced Linux (SELinux) for security.

Based on Red Hat Enterprise Linux 7.4, the latest version of Red Hat Enterprise Linux Atomic Host continues to couple the flexible, modular capabilities of Linux containers with the reliability and security of Red Hat Enterprise Linux in a reduced footprint, to decrease its attack surface and to provide only the packages needed to light up hardware and run containers. Here's a look at some of the major changes in the latest version of Red Hat Enterprise Linux Atomic Host:

- *OverlayFS is now fully supported with SELinux.* After being introduced in Red Hat Enterprise Linux 7.1 as a Technology Preview, OverlayFS is now fully supported in Red Hat Enterprise Linux 7.4 and Red Hat Enterprise Linux Atomic Host 7.4. Note that OverlayFS is still only supported with XFS as the underlying file system, and is not supported for persistent storage for containers.
- *Full support for package layering with rpm-ostree.* We introduced package layering with rpm-ostree in Red Hat Enterprise Linux Atomic Host with Red Hat Enterprise Linux 7.3; the Red Hat Enterprise Linux 7.4 release brings package layering with rpm-ostree into full support. Package layering allows you to add packages that aren't part of the original install to the system permanently. This is useful for adding diagnostic tools, monitoring tools, or packages that add support for hardware.
- *Introduction of LiveFS as a Technology Preview.* Previously, using the atomic host install and atomic host uninstall commands (also known as package layering) with Red Hat Enterprise Linux Atomic Host required a reboot to take effect. In this release, we're delivering LiveFS functionality to allow you to let package changes take effect without a reboot.
- *User namespaces with Linux containers.* With Red Hat Enterprise Linux 7.4 and Red Hat Enterprise Linux Atomic Host 7.4, we now offer user namespaces with Linux containers. This means that processes inside a container have their own namespace that maps to unprivileged namespaces outside the container. So a root user in the container does not map to the root user outside the container.

MANAGEMENT AND AUTOMATION

Red Hat Enterprise Linux, in concert Red Hat Satellite and Red Hat Ansible® Automation, enables you to spend less time triaging events and issues and more time on what matters most by providing a consistent and comprehensive management experience across versions and footprints. Management and automation improvements in Red Hat Enterprise Linux 7.4 include:

- Enhanced network control and configurations with updates to Red Hat Network Manager 1.8. This includes flexible interface options with the graphical user interface (GUI), a new command-line interface (CLI), and a new tangible user interface (TUI) for managing local, remote, or even headless systems. It also supports a broad array of many common network interface types including: Ethernet, IPoIB, VLANs, bridges, bonds, teams, Wi-Fi, WiMAX, WWAN, Bluetooth, VPN, and ATM-based DSL. The update to Network Manager also supports extended route options for firewall and route-table setup, and includes MACsec for L2 VPNs. It also contains improved DNS, DHCP configuration visibility, dynamic configuration of ethernet interface options, and the ability to force a failover to standby link to allow for maintenance or to update links in a bond.
- Simplified availability for both new and existing Red Hat Enterprise Linux deployments with the addition of Cockpit in the base repository without the requirement of enabling additional repositories. This includes access to multiple tools like diagnostic reports, logs, and SELinux. Cockpit also integrates with existing tools like Performance Co-Pilot and provides simple management for subsystems like network or storage via system APIs.

- Better support for AWS EC2 Instances and more improvements to the AWS integration including faster boot times, new network adapter support, NVMe support, and elastic Volume support.
- Easy management of heterogeneous Red Hat Enterprise Linux environments with system roles (Tech Preview), a collection of Ansible roles that serve as a consistent configuration interface to configure subsystems and services with Red Hat Enterprise Linux 6.9 and later versions of Red Hat Enterprise Linux. The Ansible automation engine package is included as means of implementing the Red Hat Enterprise Linux system roles. The initial set of roles include: kdump, postfix, timesync, selinux, and network. The Ansible automation engine package is included as a means of implementing the Red Hat Enterprise Linux system roles.

MULTIPLATFORM SUPPORT / PARTNER ECOSYSTEM

Red Hat remains committed to providing customer choice when it comes to datacenter infrastructure. Red Hat Enterprise Linux 7.4 continues this trend with availability across multiple architectures, including IBM Power, IBM System z, and the new 64-bit Arm.

- For IBM Power architecture, this release introduces:
  - Red Hat Enterprise Linux 7.4 for Power Little Endian (POWER9), the latest version of the world's leading enterprise Linux platform for IBM Power Systems:
    - Enables IBM Power servers equipped with new POWER9 processors
    - Brings support for containers with Open Container Initiative (OCI)-compatible runtime and system images
    - Adds single-host KVM virtualization, letting customers increase system utilization by running multiple applications side by side
  - Red Hat Enterprise Linux 7.4 for Power Little Endian, compatible with POWER8-based systems, now includes support for:
    - High availability add-on
      - Provides continuous availability by ensuring no single point of failure across your Red Hat Enterprise Linux environment
    - Resilient storage add-on
      - Lets users access the same storage device over a network—using either shared storage or a clustered file system
    - Red Hat container runtime (OCI format) and base image
      - Available via Red Hat Enterprise Linux "extras" channel
  - For 64-bit Arm architecture, this release introduces Red Hat Enterprise Linux for Arm:
    - Newest member of the Red Hat Enterprise Linux portfolio, adds support for 64-bit Arm server platforms
    - Single host KVM virtualization (as an unsupported development preview), enables customers to increase system utilization by running multiple applications side by side
  - Red Hat Software Collections and Red Hat Developer Toolset

- Newer versions of programming languages, databases, web servers, and other components available across x86_64, 64-bit Arm (aarch64), IBM z Systems (s390x), and IBM Power Little Endian (ppc64le) architectures
- Red Hat Developer Toolset, delivering the latest stable versions of essential C and C++ and supporting development tools to enhance developer productivity and improve deployment times

SECURITY

Red Hat Enterprise Linux 7.4 increases defensive and auditing capabilities that reduce your attack surfaces and allow deeper incident forensics, securing your production environment that runs mission-critical workloads that are both cloud-native and traditional. This includes:

- Enhanced audit and forensic capabilities to help simplify how administrators filter the events logged by the audit system, gather more information from critical events, and to interpret large numbers of records. It does this by rebasing the audit userspace and backporting a number of upstream kernel features; the highlights include: new subject and session ID filters, recording of kernel module names on module load and unload, recording the user's terminal on login, and a new "normalizer" to translate audit events.
- Increased protection from data leaks and data injection with USB Guard, a feature that allows for greater control over how plug-and-play devices can be used by specific users. Full support for x86_64, Technology Preview for IBM POWER Systems, and no support for System-Z.
- Enhanced container security functionality with full support for using SELinux with OverlayFS to secure the underlying file system and the ability to use Docker and use namespaces together for fine-grained access control.
- Strengthened data protection for encrypted data removed from a trusted network using NBDE, a means to use a network service as part of the unlocking mechanism, by encrypting the passphrase used. This means the passphrase can only be unencrypted and passed to LUKS if the host can contact the service to complete the decryption. Client systems with Clevis installed and enrolled with Tang server can automatically unlock their LUKS encrypted root volume partitions without requiring an administrator to enter the password manually.
- Improved kernel security that deters exploits relying on knowledge of the location of kernel internals with kernel address space randomization [KASLR] (Technology Preview) that allows the kernel to randomize the physical and virtual address when vmlinuz is decompressed.
- NIST-certified security compliance scanner included in Red Hat Enterprise Linux 7.4, bringing assurance to customers requiring security certification of all components used in their environment. Specifically, the OpenSCAP tools have been certified against NIST standards, leading to easier adoption for customers in regulated environments.
- Regulation-ready identity management (IdM) for organizations controlled by U.S. government regulation. IdM can now authenticate users solely via SmartCard, and multiple roles within IdM can be assigned to a user's SmartCard credentials. IdM is also now supported in FIPS mode.
- Automated cloud encryption with Opportunistic IPsec, which allows for all hosts in a cloud to build IPsec encrypted tunnels to any other host in the same cloud, without administrator needing to create n*n configurations.

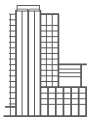
PERFORMANCE

Red Hat Enterprise Linux 7.4 augments its already industry-recognized performance for demanding modern business application bandwidth and storage requirements. Engineered to meet the needs of organizations seeking to both modernize and optimize their enterprise IT infrastructure, Red Hat Enterprise Linux 7 new features include:

- Improved LVM/DM cache including on-disk metadata changes and algorithm/structural improvements that will improve LVM cache startup and shutdown times, adaptability to changing workloads, better operation on large machines with high CPU counts, and overall performance improvements.
- Increased flexibility and reduced overhead with support for NVMe over fabric when accessing high performance NVMe storage devices located in the datacenter on both Ethernet or Infiniband fabric infrastructures.
  - NVMe over Fabric provides a new standard for native access to off-host NVMe storage arrays without the overhead of translating to an alternate transport like iSCSI.
  - Allows for access to NVMe features like inherent multiple I/O queues by the host with minimal overhead, and is not tied to a specific interconnect or network transport (PCIe or Ethernet).
  - Provides access to NVMe based SSDs in certain AWS EC2 instance types.
- Faster startup times for critical applications deployed on Amazon Web Services (AWS) with support for Elastic Network Adapter (ENA) that provides new network capabilities and decreases boot times. ENA is a modern network adapter that provides up to 20 Gbps on certain AWS instance types.

CONCLUSION

For more information on Red Hat Enterprise Linux 7.4, visit the Red Hat Enterprise Linux product page, review the release notes in the Red Hat Customer Portal, visit the Red Hat Enterprise Linux blog, or contact a Red Hat sales representative.



ABOUT RED HAT

Red Hat is the world's leading provider of open source software solutions, using a community-powered approach to provide reliable and high-performing cloud, Linux, middleware, storage, and virtualization technologies. Red Hat also offers award-winning support, training, and consulting services. As a connective hub in a global network of enterprises, partners, and open source communities, Red Hat helps create relevant, innovative technologies that liberate resources for growth and prepare customers for the future of IT.

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NORTH AMERICA
1 888 REDHAT1

EUROPE, MIDDLE EAST, AND AFRICA
00800 7334 2835
europe@redhat.com

ASIA PACIFIC
+65 6490 4200
apac@redhat.com

LATIN AMERICA
+54 11 4329 7300
info-latam@redhat.com

redhat.com
#f10498_0118