

WHAT'S NEW IN RED HAT ENTERPRISE LINUX 7.3

TECHNOLOGY OVERVIEW

Red Hat® Enterprise Linux® 7.3 is the latest version of the world's leading enterprise Linux platform. It provides enterprises with a security-enhanced, stable platform for innovation, whether it's Internet-of-Things (IoT) deployments or Linux container-based applications. This technology overview includes additional information on new features and enhancements as they relate to performance, security, reliability, Linux containers, and more.

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 to each application. And, of course, there are continued improvements to scalability, reliability, and security.

Developers and DevOps: 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.

As the latest version of the world's leading enterprise Linux platform, Red Hat Enterprise Linux 7.3 provides enterprises with a security-enhanced, stable platform for innovation, whether it's Internet-of-Things (IoT) deployments or Linux container-based applications. 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 have emerged as a key open source application packaging and delivery technology, combining lightweight application isolation with the flexibility of image-based deployment methods. Developers are rapidly embracing Linux containers because they simplify and accelerate application deployment.



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To further accelerate app development, businesses are turning to platforms designed to support Linux container technology, including Red Hat Enterprise Linux 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.

In addition to providing the latest Docker engine, Red Hat Enterprise Linux 7.3 includes a new container signing implementation via a Technology Preview of the Atomic command-line interface (CLI).

SECURITY

From network firewall control to capabilities for securing containers for application isolation, Red Hat Enterprise Linux includes military-grade security technologies to prevent intrusions and protect your data.

Red Hat Enterprise Linux 7.3 introduces several new and enhanced features for improved security, including several updates to SELinux – a mechanism for enforcing granular, system-level access control policies. Updates allow for faster policy creation and improved ease of use.

In addition, OpenSCAP and the OpenSCAP Workbench have been updated. The OpenSCAP suite supports the use of the Security Content Automation Protocol and content modules to automate security compliance and vulnerability management against predefined security baselines. This release introduces support for atomic scan, which allows for the inspection of Linux containers to identify known vulnerabilities and out-of-compliance issues.

In terms of network security, Red Hat Enterprise Linux 7.3 now supports Media Access Control security (MACSec) v2 to enable data link layer encryption between both Red Hat Enterprise Linux servers and virtual machines. The encryption can also be offloaded to capable hardware, lowering the overhead associated with higher-level protocol encryption.

The audit subsystem in Red Hat Enterprise Linux provides a way to log and track security-relevant information on the system. The audit subsystem can monitor and log a variety of system activities and is based on preconfigured rules. With the release of Red Hat Enterprise Linux 7.3, the audit subsystem is both faster and easier to use.

IDENTITY MANAGEMENT

Red Hat's Identity Management (IdM) solution protects the datacenter by integrating systems, services, and applications into a single ecosystem that provides authentication, access control, enterprise single sign-on (SSO), identity information, and the ability to configure associated policies. Put simply, it provides centralized identity management for the enterprise.

In addition to improved performance for large installations, IdM now supports smart card authentication with Active Directory and domain name server (DNS) locations for IdM services. Administrators can also very easily isolate pain points in their setup with the help of new "managed topology" features.

DESKTOP AND WORKSTATION

Red Hat Enterprise Linux Desktop and Red Hat Enterprise Linux Workstation bring the power and innovation of the world's leading enterprise Linux platform to the desktop. Featuring a robust, highly secure, and cost-effective environment with a comprehensive set of leading end-user applications, Red Hat Enterprise Desktop and Red Hat Enterprise Linux Workstation are compelling alternatives to proprietary operating systems.

Red Hat Enterprise Linux 7.3 provides the following new features and improvements to desktop applications:

- **LibreOffice** – rebased to version 5.0 – the popular LibreOffice suite includes improved import and export filters for both Writer and Calc as well as improved support for additional document formats, including Apple Pages.
- **QT 5** – in addition to continued support for QT 4 – workstation developers who build graphical applications using the QT framework now have access to QT 5.
- **GNU Image Manipulation Program (GIMP)** – rebased to version 2.8.16 – this powerful open source image editor is enhanced with new shortcuts and improved file management.
- **Pidgin** – the popular universal chat client has been re-introduced to Red Hat Enterprise Linux.
- **Inkscape** – rebased to version 0.91 – this open source drawing and painting tool now includes a new “trace pixel art” feature for creating vector art, a new symbol library, and new tools for arranging and aligning objects.
- **Rhythmbox** – rebased to 3.3.1 – this open source music management application includes new custom recording settings, new language support, many new plug-ins, and improved overall stability.

FILE SYSTEMS AND STORAGE

File systems and storage improvements in Red Hat Enterprise Linux 7.3 reduce latency and enhance the manageability of the storage platform. Of note, the Block SCSI layout format (for both client and server) and the Flex Files layout format (client only, and in Tech Preview) are now both supported for use with parallel Network File System (pNFS). This enhancement helps to make clusters of pNFS systems easier to manage while taking advantage of the high-speed, low-latency direct access to disks that pNFS provides. No more routing all of your data through a single NFS server – just access disks directly for high speed transfers.

Also new with the release of Red Hat Enterprise Linux 7.3 is support for nonvolatile memory devices. Applications that use EXT4 or XFS memory mapped files can now store data directly on this resilient, high-speed, lower-cost memory, resulting in faster access to data and (very) low latency.

In terms of easier management, Red Hat Enterprise Linux 7.3 also provides these key ease-of-use features:

1. Dynamic configuration of software-defined RAID
2. I/O stats per subsystem
3. JavaScript Object Notation (JSON) output from logical volume management (LVM)

Dynamic configuration of RAID makes it easier for system administrators to rapidly add or remove RAID protection from existing defined volumes. For example, as a system moves from test to production, administrators can easily add RAID 5 or 6 protection to their existing storage without needing to reformat or move data from a given disk.

Red Hat Enterprise Linux 7.3 provides increased visibility into storage usage and performance through enhancements to dmstats, a program that displays and manages I/O statistics for user-defined regions of devices using the device-mapper driver. With new support for sub-groups and per-file analysis, administrators can use dmstats to quickly get an in-depth view of input/output operations at a more granular level, such as a virtual machine disk image.

Finally, administrators who want to automate the provisioning of a system can do so more easily with new easily parseable JSON-formatted output from the LVM system, which is much easier to parse within an application.

NETWORKING

For Red Hat Enterprise Linux 7.3, the networking infrastructure provides high performance, efficient multitenancy, network security, and easy management for applications in enterprise and cloud deployments.

HIGH PERFORMANCE

Stream Control Transmission Protocol (SCTP) performance.

SCTP, which provides reliable multihoming for mobile networks and datacenters, shows improved session connectivity and throughput with support for Receive Side Scale (RSS), Receive Flow Steering (RFS), Generic Segmentation offload, and relativistic hash tables (rhashtables).



Improved packet processing. Lockless bulk memory allocation in the SLUB allocator brings network packet forwarding closer to achieving 148 Mpps with 64B packets needed for 100 Gbps.

New fast datapath (FD) channels. For early validation of datapath (openvswitch, dpdk) features in cloud deployments using Red Hat OpenStack® Platform, Red Hat OpenShift, and Red Hat Virtualization:

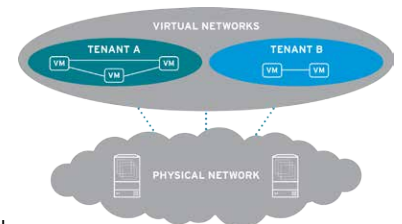
- DPDK accelerated Open vSwitch (OVS-DPDK) with vhost-user multiqueue for improved throughput
- Support for OVS 2.5 unified package with DPDK 2.2
- DPDK 16.07 [Extras/FD beta] for guest VM with VFIO no_iommu (no support) driver

EFFICIENT MULTITENANCY FOR CLOUD DEPLOYMENT

Lightweight tunneling (LWT) provides efficient, flexible, and scalable overlay tunneling for Linux bridges and openvswitch using Virtual extensible LAN (VXLAN), generic routing encapsulation (GRE), and Geneve.

VXLAN now supports IPv6 addressing for network isolation of east-west traffic in datacenters. VXLAN provides improved CPU efficiency with receive-side scaling and TCP Segmentation Offload (TSO) to NIC.

New Geneve overlay tunneling, which supports Service Function Chaining (SFC) with variable options headers to carry metadata in data packet. Based on the type of application – web or video – metadata in the packet header is used to steer the flow dynamically through one or more services like firewall, DNS, or load balancer.



NETWORK SECURITY

MACsec v2 encryption – (IEEE 802.1AE) provides L2 encryption for servers, VMs, and containers and avoids costly IPsec tunnels requiring full-mesh between applications.

NetFilter tables (NFT) [Tech preview] – NFT provide flexible advanced filtering for access list and firewall use cases and a next-generation alternative to iptables.

Open vSwitch (OVS) Contrack – OVS 2.5 supports connection tracking for stateful flows for firewall and access control with Red Hat Openstack Platform, Red Hat Virtualization, and Red Hat OpenShift.

NETWORK MANAGEMENT AND HARDWARE SUPPORT

Network Manager 1.4 – Modular service is based network management with new virtual private network (VPN) plugin, improved security for Wi-Fi and IPv6, support for VXLAN, MACVLAN, MACVTAP, bonding, and teaming.

New hardware support – Modem Manager 1.6 – provides Wi-Fi device NICs for Internet of Things (IoT) and new DPDK PMD and SR-IOV NIC drivers – Intel, Mellanox, Broadcom, Qlogic New Intel Omnipath (OPA) NICs and servers. And new Mellanox drivers are included for Infiniband and RoCE.

HIGH AVAILABILITY

Red Hat Enterprise Linux 7.3 provides several new reliability, redundancy, and operations-friendly features. It's designed to provide customers with integrated, fully supported disaster recovery and application level scale across geo-located datacenters, as well as improved operational ease of use. These enhancements include:

- The ability to configure *pacemaker* to manage multisite and stretch clusters across geo-locations for disaster recovery and scalability use cases. This fully integrated solution helps customers cut the time and costs associated with deploying and maintaining custom or third-party solutions.
- Enhanced *pacemaker* alerts to allow customers to configure and trigger notifications when the status of a managed cluster changes. Alerts can now be configured to send notifications via SNMP and SMTP for integration with ticketing, email, and messaging services and can also be used to trigger external actions such as custom script execution. This also helps customers cut the time and costs associated with deploying and maintaining custom or third-party solutions.

INTERNET OF THINGS

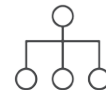
As a powerful platform upon which to run enterprise-scale IoT implementations, Red Hat Enterprise Linux 7.3 introduces several key features to help power these deployments:

- Support for connections to low-power integrated devices via Bluetooth LE (Low Energy), an extension of the Bluetooth standard designed for low-power devices like IoT sensors
- The ability to connect to high-end industrial controllers and laboratory instrumentation via support for the controller area network (CAN) bus

NETWORK + SECURITY + CLOUD



NETWORK MANAGEMENT



- Enhanced support for RS-485 serial networking, the most widely used interconnect for industrial communications
- Upgrade to eMMC 5, supporting the latest version of embedded storage, which IoT devices and gateways commonly use to hold all software
- Upgrade of Modem Manager to the latest version, which provides enhanced support for cellular modems that simplifies the use of cellular networks to connect IoT internet gateways

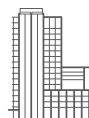
RED HAT ENTERPRISE LINUX VARIANTS

With the release of Red Hat Enterprise Linux 7.3, Red Hat Enterprise Linux for SAP Applications and Red Hat Enterprise Linux for SAP HANA are now available for the following hardware architectures:

- IBM z Systems
- IBM Power, big endian

Note that support for IBM Power, little endian is not yet available. These Red Hat Enterprise Linux variants are optimized for SAP environments, providing performance tuning right out of the box.

For more information on Red Hat Enterprise Linux 7.3, 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 solutions, using a community-powered approach to provide reliable and high-performing cloud, virtualization, storage, Linux, and middleware technologies. Red Hat also offers award-winning support, training, and consulting services. Red Hat is an S&P company with more than 80 offices spanning the globe, empowering its customers' businesses.



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