**RHEL (RedHat Enterprise Linux)**

**Table Showing Features and their comparison for RHEL version 7, 8 and 9**

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| --- | --- | --- | --- |
| Features | RHEL 7 | RHEL 8 | RHEL 9 |
| Release Date | June 10,2014 | May 7, 2019 | May 18, 2022 |
| Based On | Fedora 19,20 | Fedora 28  CentOS Stream 8 | Fedora 34  CentOS Stream 9 |
| Kernel Version | Linux kernel 3.10 | Linux kernel 4.18 | Linux Kernel 5.14 |
| Kernel Codename | Maipo | Ootpa | Plow |
| Init System (Default) | In RHEL 7, the default init system is still System V (SysV) init, but systemd is also included and can be used instead. | The default init system is systemd, which has replaced SysV init completely. Systemd version 239. | RHEL 9 uses systemd version 249. The newer version of systemd in RHEL 9 provides better integration with other system components and improved system management. |
| Change in boot configuration files | In RHEL 7,  for MBR boot mode systems configuration file is /boot/grub2/grub.cfg file and for UEFI boot mode systems configuration file is /boot/efi/EFI/redhat/grub.cfg | For UEFI systems the configuration file is /boot/efi/EFI/redhat/grub.cfg  compared to the /boot/grub2/grub.cfg BIOS based setups. | Configuration files for the GRUB boot loader are now stored in the /boot/grub2/ directory on all supported CPU architectures.  The /boot/efi/EFI/redhat/grub.cfg file, which GRUB previously used on UEFI systems, is now a symbolic link to the /boot/grub2/grub.cfg file. This simplifies user experience as you can boot the same installation with either EFI or legacy BIOS. |
| Initial Setup | In RHEL 7, the configuration of Licensing, Subscription Manager, and User Settings is typically performed after the initial installation and during the first login to the GNOME desktop environment. | RHEL8 users need to configure initial setups of Licensing, Subscription manager, and User Settings prior to gnome-initial setup and login screens. | To improve user experience removing the initial startup screen it is easy for new users when using RHEL 9. Fast and easy process. |
| Network Time Synchronization | Using either ntp or chronyd. | Uses only Chronyd.  Chrony utilizes the “Combination Algorithm” to achieve faster synchronization.  The ntp implemenation is not supported in RHEL8. | Chronyd is used and  NTP can also be implemented. |
| Package/Software Management | Yum being used and it is based on version 3.0.x | Package management is done by DNF (YUMv4).  Yum is based on DNF technology and yum command provides backward compatibility with YUM v3 being used in earlier versions. The yum command is just a symbolic link to dnf. | DNF, YUM |
| Repositories | RHEL 7 have  1 Channel or repository for packages.  Repo ID: rhel-7-server-rpms  Repo Name: Red Hat Enterprise Linux 7 Server (RPMs) | Red Hat Enterprise Linux 8 is launched with 2 main repositories  RHEL 8 have 2 Channel or repository for packages.  BaseOS  AppStream  For example: For Intel And AMD machines  Repo ID: rhel-8-for-x86\_64-appstream-rpms  Repo Name: Red Hat Enterprise Linux 8 for x86\_64 - AppStream (RPMs)  Repo ID: rhel-8-for-x86\_64-baseos-rpms  Repo Name: Red Hat Enterprise Linux 8 for x86\_64 - BaseOS (RPMs) | Red Hat Enterprise Linux 9 is launched with 2 main repositories with updated package versions  BaseOS  AppStream  For example: For Intel And AMD machines  Repo ID: rhel-9-for-x86\_64-appstream-rpms  Repo Name: Red Hat Enterprise Linux 9 for x86\_64 - AppStream (RPMs)  Repo ID: rhel-9-for-x86\_64-baseos-rpms  Repo Name: Red Hat Enterprise Linux 9 for x86\_64 - BaseOS (RPMs) |
| SELinux  (Security-Enhanced Linux) | RHEL 7 uses the traditional monolithic SELinux policy where all rules are contained within a single policy file. | Red Hat Enterprise Linux 8 introduces a modular SELinux policy, where policies are split into smaller modules.  This modular approach allows for easier management, updates and customization of SELinux policies.    RHEL 8 released with Support for disabling SELinux through the SELINUX=disabled option in the /etc/selinux/config is supported. | Red Hat Enterprise Linux 9 released without support for disabling SELinux through the SELINUX=disabled option in the /etc/selinux/config file has been removed from the kernel. |
| Cockpit | Not by default.  After RHEL 7.7 can be done manually | Cockpit is now installed by default and available. This gets installed automatically on non-minimal mode and required ports gets enabled in firewall.  The "Cockpit" provides an enhanced framework which can be used to access/edit/change many system settings. This provides access over a web interface which can be launched using http://<hostname>:9090 url. | To access the RHEL 9 web console, first enable the cockpit. socket service. Red Hat Enterprise Linux 9 includes the RHEL 9 web console installed by default in many installation variants. |
| MAX. RAM Supported | 12TB | 24TB | 48TB |
| Network Scripts | RHEL 7 primarily uses traditional network scripts located in ‘/etc/sysconfig/network-scripts/’ directory.  These scripts, such as ‘if-cfg-<interface>’ are used to configure network interfaces with static or Dynamic DHCP IP addressing, gateway settings, DNS and other parameters. | Red Hat Enterprise Linux 8 network-scripts package was still available but deprecated in an updated version.  Deprecated packages are included for backward compatibility and to support existing configurations, but they are not actively maintained and enhanced. | RHEL 9 does not contain the network-scripts package.  To configure network connections in RHEL 9, use Network Manager for managing the connections. |

**Explanation:**

**Init System**

In RHEL 7, the default init system is still System V (SysV) init, but systemd is also included and can be used instead. However, most system administrators prefer to use systemd as it offers several advantages over SysV init, such as faster boot times, better resource management, and improved logging and debugging capabilities.

In RHEL 8 and RHEL 9, the default init system is systemd, which has replaced SysV init completely. Systemd is a system and service manager that provides a range of features, including parallel startup of system services, on-demand activation of services, socket-based activation, transactional dependency handling, and more.

**Chrony**

Chrony utilizes the "**Combination Algorithm**" to achieve faster synchronization. The Combination Algorithm employed by Chrony is a sophisticated approach that combines the measurements from the network time sources and the local system clock to determine the most accurate and reliable time. By analyzing the offset and delay of different time sources, Chrony selects the best sources for synchronization, resulting in faster and more accurate time synchronization.