Linux System Administration

Summer Training

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Objective(s)

Define and explain Linux, open source, Linux distributions, Red Hat Enterprise Linux, and Proprietary Software.

What Is Linux?

Definition

Linux is an open-source operating system kernel that forms the basis of various distributions (distros). It's widely used in different environments, from personal computers to servers, and powers a significant portion of the internet and modern technology infrastructure.

Why Learn About Linux?

Linux is crucial for IT professionals due to its widespread use in various applications and systems, such as:

- Web servers and e-commerce sites
- Point-of-sale systems and stock markets
- Smart TVs, in-flight entertainment systems, and supercomputers
- Cloud computing and container-based microservices
- Mobile applications and IoT devices

> ***Alert!***
> Learning Linux enhances career opportunities, interoperability with other systems, and is essential for roles in application development, cloud computing, and enterprise environments.

What Makes Linux Great?

- **Open Source:** Allows users to view, modify, and share the source code, fostering innovation and collaboration.
- **Command-Line Interface (CLI):** Simplifies automation, deployment, provisioning, and system administration.
- **Modularity:** Components can be easily replaced or removed, catering to various purposes from general-use systems to specialized appliances.

What Is Open Source Software?

Answer

Open source software has source code that anyone can use, study, modify, and share. Unlike proprietary software, open source promotes transparency, collaboration, and rapid innovation. Open source licenses allow users to freely use, view, change, compile, and distribute the code.

Types of Open Source Licenses

- **Copyleft Licenses:** Require derived works to also be open source (e.g., GNU General Public License).
- **Permissive Licenses:** Allow code to be reused under more restrictive licenses, maximizing code reusability (e.g., MIT License).

Who Develops Open Source Software?

Answer

Open source software development is predominantly professional, with many developers employed by organizations that contribute to open source projects. Volunteers and academics also play a significant role, especially in emerging technologies.

What Is a Linux Distribution?

Answer

A Linux distribution is an operating system built from a Linux kernel and includes user programs and libraries. Distributions provide a complete, ready-to-use system with prebuilt and tested tools, facilitating the installation and management of Linux systems.

Who Is Red Hat?

Answer

Red Hat is a leading provider of open source software solutions, known for its Red Hat Enterprise Linux distribution. The company supports various open source projects and technologies, including cloud solutions like OpenStack and OpenShift, and storage technologies such as Ceph and Gluster.

Mission

Red Hat's mission is to foster better technology through community-powered open source innovation.

Fedora

- Fedora is a community-driven project that creates a free, comprehensive Linux-based operating system. Sponsored by Red Hat, Fedora integrates the latest upstream software into a fast-moving and secure distribution, emphasizing innovation and excellence over long-term stability.
- Major updates are released every six months, with support for each release lasting about a year. This rapid update cycle makes Fedora less suitable for stable, long-term production environments but positions it as a source of innovation for the entire Enterprise Linux ecosystem.
- Software typically matures in Fedora before being included in CentOS Stream and ultimately in Red Hat Enterprise Linux (RHEL).

Extra Packages for Enterprise Linux (EPEL)

A Fedora Special Interest Group (SIG) maintains EPEL, a community-supported package repository aligning with major RHEL releases. EPEL allows RHEL users to run additional software not supported in RHEL, maintaining Fedora's quality level, but without official Red Hat support. EPEL Next provides a repository for building packages against CentOS Stream, accommodating upcoming RHEL updates or minimum version requirements present in CentOS Stream but not yet in RHEL.

CentOS Stream

CentOS Stream is the upstream project for RHEL, offering transparent development and open community contributions for the next RHEL version. It supports continuous integration and delivery, with tested and stable nightly builds. Contributors can influence RHEL's development, ensuring faster integration of patches and responsiveness to security, technology, and customer needs. The CentOS project promotes sustainable open source software, enhancing the development and security of RHEL derivatives.

Red Hat Enterprise Linux

- Red Hat Enterprise Linux (RHEL) is a leading, production-ready Linux distribution supported by Red Hat. It undergoes extensive testing and is backed by a global support ecosystem offering certifications, consulting, training, and multi-year maintenance guarantees.
- RHEL major releases are built from the open and transparent CentOS Stream development project, which sources from Fedora. This allows for community feedback and contributions, contrasting with the previous, less transparent development model.
- RHEL uses a subscription-based support model without charging license fees for open-source software. Subscriptions include product support, maintenance, updates, security patches, and access to the Customer Portal Knowledgebase, utilities, and downloadable Red Hat products.

Key Differences Between Fedora, CentOS Stream, & RHEL

	Fedora	**CentOS Stream**	**RHEL**
Expected lifecycle	12-18 months	5 years	10 years
Software vendor certified	No	Usually not	Yes
Documentation provided by	Community	Community	Red Hat
Expert support available	No	No	Yes
Product security team	No	No	Yes
Security certifications	No	No	Yes
No-cost options	Yes	Yes	Yes
Management tools	No	No	Yes

What is proprietary software?

- Proprietary software, also known as closed-source software, is software that is owned by an individual or a company (the software's publisher).
- The publisher retains the exclusive rights to the software, including the source code, which is typically not made available to the public.
- Users are given a license to use the software under specific conditions, but they do not own it. This license often restricts how the software can be used, modified, copied, and distributed.

What is a key characteristic of open source software?

(A) It is always free of cost.

(B) The source code is available for anyone to view, modify, and distribute.

(C) It is owned and controlled by a single company.

(D) It cannot be used for commercial purposes.

Answer

Answer: B

Which of the following is a common open source license?

(A) EULA

(B) BSD

(C) MIT

(D) Both B and C

Answer

Answer: D

Open source software development is often characterized by:

(A) A single developer controlling the entire process.

(B) Collaborative contributions from multiple developers worldwide.

(C) Limited access to the software's functionality.

(D) Expensive licensing fees.

Answer

Answer: B

Which of the following is an example of open source software?

(A) Microsoft Office

(B) Adobe Photoshop

(C) Linux

(D) macOS

Answer

Answer: C

What benefit does open source software typically provide?

(A) No-cost usage for all features.

(B) Restricted user control over the software.

(C) Regular, mandatory payments for updates.

(D) The ability to inspect, modify, and enhance the software.

Answer

Answer: D

What is proprietary software?

(A) Software that is freely available to the public.

(B) Software whose source code is not available to the public.

(C) Software that can be freely modified and redistributed.

(D) Software developed by non-profit organizations.

Answer

Answer: B

Which of the following is NOT a characteristic of proprietary software?

(A) The source code is closed and not available for public viewing.

(B) Users are typically required to purchase a license to use the software.

(C) The software can be freely modified and distributed by anyone.

(D) It often comes with dedicated support and maintenance from the publisher.

Answer

Answer: C

Which company is known for its proprietary software products?

(A) Red Hat

(B) Mozilla

(C) Microsoft

(D) Apache Foundation

Answer

Answer: C

Proprietary software typically includes which of the following restrictions?

(A) Limited access to the software's source code.

(B) Restrictions on copying, modifying, and distributing the software.

(C) Usage governed by an End User License Agreement (EULA).

(D) All of the above.

Answer

Answer: D

Which of the following is an example of proprietary software?

(A) MySQL

(B) GIMP

(C) Adobe Photoshop

(D) Ubuntu

Answer

Answer: C

Thanks!

Thank you
for your attention.