

# An Overview: Role of Linux in Public and Private Sector

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## Abstract

Linux has played a major role in the development of software's. It is an open source system software. It offers different tools for development of software's especially Embedded and system software's. The Linux operating system is playing emerging role in both the private and public sectors. It is an increasingly attractive option as a computing platform to run the powerful computer servers that are at the heart of computer networks, including the Internet itself. Nowadays, Linux is using in various smart classes in schools for handling the contents in clients and servers side also. TeachNext and Extramarks companies are using Linux operating system in schools for smart classes. This paper is generally consists of role of Linux in private and public sector.

## Keywords

Operating System, Open Source, Windows, Technology Platforms.

## Introduction

In the era of IT, Linux is installed on billions of computer systems and is used by home users and professionals alike for a wide range of works. It is also good operating system (It is an interface between the users and hardware) for latest technology cloud and fog computing. It offers different flavors such as Ubuntu, Red hat, CentOS and Fedora. The biggest benefit of Linux operating system is that features can be customize as well as it is an open source. The significance of the Linux adoption decision is further magnified, and made more complex, by the fact that Linux is open source software, in contrast to commercial software. On top of all that, widespread public-sector adoption of open source platform software can greatly affect the economic development of a country's entire software industry, a critically important consideration for public-sector decision makers [1].

Open-source software is a type of computer software in which source code is released under a license in which the copyright holder grants users the rights to study, change, and distribute the software to anyone and for any purpose. Open-source software may be developed in a collaborative public manner [2]. Many MNC's are using Linux operating system for servers. It is more secure. Because, it contains so many tools. It provides a good platform for latest technology.

## II. Operating system

An operating system is an interpreter between the users and hardware. It provides a environment for application softwares. Operating system is a platform for software under hardware. Operating system is a program that acts as an intermediary between a user of a computer and the computer hardware. Operating system controls and coordinates the use of the hardware among the various application programs for the various users. Operating System defines Resource allocator that manages and allocates resources. . Operating System defines Control program as controls the execution of user programs and operation of I/O devices [3]. Operating System defines Kernel as the one program running at all time. OS Features Needed for Multiprogramming I/O routine supplied by the system. Memory management the system must allocate the

memory to several jobs. CPU scheduling the system must choose among several jobs ready to run. Allocation of devices [3]. Linux is a Unix-like operating system that was designed to provide pc users a free or low rate OS comparable to traditional and costlier Unix systems. The fame of Linux OS has mainly arise because of excellent performance and effectiveness. The kernel of Linux OS (the central part of the operating system) was built by Linus Torvalds at the University of Helsinki in Finland. We can give the differences between Linux and Windows operating systems from various viewpoints. It is tough to answer which operating system works better and which doesn't [4].

## Open Source Software

The term "open source" refers to something people can modify and share because its design is publicly accessible.

The term originated in the context of software development to designate a specific approach to creating computer programs. Today, however, "open source" designates a broader set of values—what we call "the open source way." Open source projects, products, or initiatives embrace and celebrate principles of open exchange, collaborative participation, rapid prototyping, transparency, meritocracy, and community-oriented development [5].

### A. What do you mean by open source software?

Open source software is software with source code that anyone can inspect, modify, and redistribute.

"Source code" is the part of software that most computer users don't ever see; it's the code computer programmers can manipulate to change how a piece of software—a "program" or "application"—works. Programmers who have access to a computer program's source code can improve that program by adding features to it or fixing parts that don't always work correctly [5].

For over 25 years the Open Source Initiative (OSI) has worked to raise awareness and adoption of open source software, and build bridges between open source communities of practice. As a global non-profit, the OSI champions software freedom in society through education, collaboration, and infrastructure, stewarding the Open Source Definition (OSD), and preventing abuse of the ideals and ethos inherent to the open source movement.

Open source software is made by many people and distributed under an OSD-compliant license which grants all the rights to use, study, change, and share the software in modified and unmodified form. Software freedom is essential to enabling community development of open source software [6].

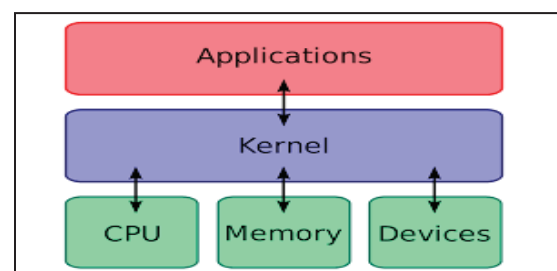


Fig. 1:

#### IV. Windows

For the second time this year, a major public service in the UK, Greater Manchester Police (GMP), has come under public scrutiny for running out-of-date software – specifically, Windows XP. In fact, the BBC reported that as many as 1 in 5 GMP devices are still running XP – an extraordinarily high proportion. Earlier this year, of course, the same outdated OS made the UK's National Health Service the first standout victim of the devastating WannaCry ransomware attack.

Over the past 20 years, I have worked with hundreds of public sector organizations in both the U.S. and the UK, helping them keep their Windows systems current. I've noticed several common challenges faced by the public sector when it comes to this increasingly difficult challenge. (Some are of these challenges are also prevalent in the private sector, but not to the same degree.) In the public sector, main challenges to staying current are typically application compatibility, budgets and skills.

##### A. Application compatibility

Greater Manchester Police cited the incompatibility of some crucial applications with more recent versions of Windows as a key reason that it maintains Windows XP on so many devices. No question, application compatibility is a crucial workstream when preparing for a Windows migration. If you think about a typical application estate for a typical organization, there will be a number of apps that only certain parts of that organization will use. Take finance, for example. They'll probably have SAP, some add-ons to Excel, and other legacy applications. Some of those won't be compatible with newer operating systems. This requires IT teams to ask some difficult questions: "Do we actually need this application? Is there a more modern and secure alternative? Can the app be virtualized? Can the device be ported to a safer operating system?"

If users really can't do without the app, and can't update it, then IT needs to consider excluding certain areas from the OS migration, and enhancing the security around those areas. This can mean steps such locking down firewall ports, so that viruses can't land and use them as boxes to bounce off and propagate through.

Application compatibility is a challenge for every organization, whether it may be public or private. In the private sector organizations I am working, Linux is used, however, such as government bodies and hospitals, there can be incredible budget and resource elements that can discourage the process of confronting them, which means public sector IT teams put up with outdated software longer than most others would.

##### B. Budgets and skills

In the public and private sector, you'll find IT departments that are staffed very thinly. Yet, these departments must be very widely skilled: they're expected to support Configuration Manager, support and deploy applications, fix Exchange problems, address hardware faults, respond to malware incidents – the list goes on and on. This naturally results in teams comprised of people with a lot of skill breadth but often not a lot of depth. This has several repercussions. One is that it can make OS migrations daunting. Another is that teams aren't technically skilled enough to know how to automate certain facets of software updates – the very thing that could alleviate the demands on their time while also keeping systems more current and secure. In the upcoming time, Linux will use everywhere. In the age of automation, everyone wants to work with open source software. No one wants to purchase proprietary software, everyone wants to save cost.

The most crucial thing that needs to happen, though, is that senior executives need to mandate that software and operating systems stay current. A senior public and private-sector worker once told me, "In the public and private sector, no one is fired for following process" – meaning the outcome is less important than whether the official policy or process was followed. The public sector needs guidance and motivation to meet its targets, rather than just appalled post-mortems when its software shortcomings come to light. When selecting software for your business, you may have the option of choosing from open-source solutions or proprietary software. Traditionally, proprietary software has been a popular choice due to the large market share of developers like Microsoft or Apple, but open-source solutions have been gaining acceptance in the market.

According to the 2012 Future of Open Source Survey, 62 percent of respondents reported that at least half the software in their organization was open source. Proprietary solutions also have a number of disadvantages that you should consider before choosing to purchase your next license [9].

##### C. Cost

The biggest anomaly of any proprietary software is the licensing fee. Since developers sell their products to make a living, they charge you for access to their product, and in some cases, these license fees can be substantial. Open-source software, on the other hand, is generally cheaper than proprietary options, and in some cases may be available for use at no cost.

##### D. Developer Support

For the development perspectives, Linux is strong. Linux is having lots of development tools such as GCC, GDB, Emacs, Vi. With proprietary software, you are reliant on the program's developer for all updates, support, and fixes. Updates may be slow in coming, depending on the size of the development team, and it may take some time to address security holes or other problems. In addition, if the primary developer goes out of business, you may have no further updates or support unless another company buys out the project. Open-source software, on the other hand, may have a number of different teams working on the code at once, and anyone can pick up a discontinued project and expand on it since the source code is public.

##### E. Security Issues

There are some security issues such as hacking, cracking and threatening under other operating system. But, Linux is more secure and has a huge number of tools for security. I am giving some examples of security tools in Linux which is **Wireshark, NMAP, Malware antivirus scanners, Snort, NIKTO, Metasploit framework, SPIKE**. Open-source software is typically patched to address security threats faster than proprietary programs, simply due to the source code's availability to the public. With many eyes searching for loopholes, potential threats become obvious quickly. Proprietary software systems rely on the development team identifying problems, or worse, security loopholes discovered in the wild. Some proprietary developers notoriously rely on "security through obscurity", attempting to quash information about security weaknesses in order to prevent outsiders from utilizing them.

##### F. Customization

Open-source software generally offers more customization options than proprietary systems. In many cases, what you see is what

you get with a proprietary software package; you simply license it as is. With open-source programs, you may be able to find many different customized versions of the same software -- and if you cannot find a version tailored to your needs, you may be able to create one using the program's source code.

## V. Technology Platforms

The cloud computing ecosystem is vast. A multitude of technologies comprise the cloud infrastructure that companies now rely on to deliver their products and services efficiently and at a massive scale [8].

These include platforms such as OpenStack and Cloud Foundry; container technologies such as Docker, CoreOS, and Kubernetes; software-defined storage and networking technologies; DevOps tools such as Ansible and Jenkins; and more. In each case, companies are using open source software to maximize development and operations and stay competitive in a rapidly changing market.

With so many technologies, tools, and techniques to keep track of, it can be hard to know where to start learning new skills. In this article, we take a brief look at five next-generation cloud technologies and some of the key open source projects in each space to help you get up to speed.

### A. Unikernels

The biggest features of Linux is that its kernel and device drivers very powerful. Android operating system device drivers and kernel is also based upon Linux.

### B. Container Orchestration

Such tools aim to simplify management and provide a framework not only for defining initial container deployment but also for managing multiple containers as one entity — for purposes of availability, scaling, and networking, for example [8].

These are the tools you should know about include:

- Amazon ECS
- Apache Mesos
- Azure Container Service
- Cloud Foundry's Diego
- Docker Swarm
- Google Container Engine
- Kubernetes

### C. CaaS

Linux is also popular in Containers as a service (CaaS) which is a paid offering from cloud providers that includes compute resources, a container engine, and container orchestration tools. Developers can use the framework, via API (Application Programming Interface) or a web interface, to facilitate and manage container and application deployment. It can be considered a new layer for cloud platforms that lies somewhere between

Infrastructure-as-a-Service and Platform-as-a-Service offerings for application development.

According to a recent Docker blog, this means the tools in the CaaS space are aimed at easing tension between development teams and operations staff when it comes to pushing application content and monitoring and managing applications and infrastructure [8].

Some of the projects here overlap with the container orchestration, so in addition to Amazon ECS and Google Container Engine, mentioned above, you should know about:

- CoreOS Tectonic
- Docker Universal Control Plane
- Project Magnum

### D. Software-Defined Networking

SDN (Software Defined Networking) is also a revolution in the era of IT. With the help of different programming language, we can make a any network devices which can act as a switch, router, gateway and others. Because of SDN technology, hardware cost can be save. Software-Defined Networking (SDN) is a new approach to designing and managing networks that abstracts applications away from the underlying networking infrastructure. In the new architecture the control plane is separated from the data and forwarding plane of the networking devices, such as routers and switches. A centralized software-based controller can then be used to communicate between the application and devices in the infrastructure layer, which simply act on the instructions [8].

This technology is broadly used in the IT companies and other organisations due to the demands of networking devices. These are the Open source tools and projects to know include:

- Floodlight and Indigo
- Neutron
- OpenDaylight
- ONOS

### E. Software-Defined Storage

The another term Software-Defined Storage (SDS) — which means different things to different users and providers — basically abstracts logical storage services and capabilities away from the underlying hardware system for the purposes of scalability, agility, and performance. The goal is to provide Network and system administrators with more flexible storage capabilities through programming.

There are some open source tools in this space include:

#### 1. Ceph

Ceph is a distributed object store and file system designed to separate the object namespace from the underlying storage hardware, simplifying data migration.

#### 2. Gluster

Gluster FS is a free and open source scalable network file system for creating large, distributed storage solutions.

#### 3. NexentaStor

NexentaStor is the open source SDS platform from Nexenta which, the company says, delivers unified file and block storage services, scalability, and data management functionality.

#### 4. OpenStack Cinder

It is a block storage service for OpenStack that virtualizes pools of block storage devices [8].

## VI. Conclusion

At the end, I want to say that Linux operating system plays an important role in Internet Browsing and storing data at server level. In public and private sector, Linux is used to save the cost. Cloud, fog and otherscore systems share several challenges with respect to the operating system. Traditional operating system cannot fulfil all the requirements of latest technologies such as cloud computing, fog computing, SDN and others. In this paper I discussed different technologies and role of Linux in that.

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