ASSIGNMENT 1

OPERATING SYSTEM

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Computer Science Eng.

Operating System

List of operating systems

Windows OS

1. Windows OS, computer operating system (OS) developed by Microsoft Corporation to run personal computers (PCs). Featuring the first graphical user interface (GUI) for IBM compatible PCs, the Windows OS soon dominated the PC market. Approximately 90 percent of PCs run some version of Windows.

2. The first version of Windows, released in 1985, was simply a GUI offered as an extension of Microsoft's existing disk operating system, or MS-DOS. Based in part on licensed concepts that Apple Inc. had used for its Macintosh System Software, Windows for the first time allowed DOS users to visually navigate a virtual desktop, opening graphical "windows" displaying the contents of electronic folders and files with the click of a mouse button, rather than typing commands and directory paths at a text prompt.

3. Subsequent versions introduced greater functionality, including native Windows File Manager, Program Manager, and Print Manager programs, and a more dynamic interface. Microsoft also

developed specialized Windows packages, including the networkable Windows for Workgroups and the high-powered Windows NT, aimed at businesses. The 1995 consumer release Windows 95 fully integrated Windows and DOS and offered built-in Internet support, including the World Wide Web browser Internet Explorer.

4.   With the 2001 release of Windows XP, Microsoft united its various Windows packages under a single banner, offering multiple editions for consumers, businesses, multimedia developers, and others. Windows XP abandoned the long-used Windows 95 kernel (core software code) for a more powerful code base and offered a more practical interface and improved application and memory management. The highly successful XP standard was succeeded in late 2006 by Windows Vista, which experienced a troubled rollout and met with considerable marketplace resistance, quickly acquiring a reputation for being a large, slow, and resource-consuming system. Responding to Vista's disappointing adoption rate, Microsoft developed Windows 7, an OS whose interface was similar to that of Vista but was met with enthusiasm for its noticeable speed improvement and its modest system requirements.

Evolution of Windows OS

Windows1 1985   Windows 3.1 1992   Windows 95 1995   Windows XP 2001   Windows Vista 2006   Windows 7 2009   Windows 8 2012   Windows 10 2015

MAC OS

From the beginning, Apple deliberately sought to minimize by design the user's conceptual awareness of the operating system as such. Tasks that on other products required a more explicit working knowledge of an operating system would on a Macintosh be accomplished by intuitive mouse gestures and manipulation of graphical control panels. The intention was that the product would thus be more user-friendly and so more easily mastered. This would differentiate it from devices using other operating environments, such as MS-DOS machines, which were more technically challenging to operate.

Mac OS is a series of graphical user interface-based operating systems developed by Apple Inc. (formerly Apple Computer, Inc.) for their Macintosh line of computer systems. Mac OS is credited with popularizing the graphical user interface. This is the operating system that runs on Macintosh computers. It is pronounced, "mack-oh-es." The Mac OS (currently OSX) has been around since the first Macintosh was introduced in 1984. Since then, it has been continually updated and many new features have been added to it. Each major OS release is signified by a new number (i.e. Mac OS 8, Mac OS 9).

Since the core of the Mac OS was nearly decades old, Apple decided to completely revamp the operating system. In March of 2001, Apple introduced a completely new version of the Mac OS that was written from the ground up. The company dubbed it "Mac OS X," correctly pronounced "Mac OS 10." Unlike earlier versions of the Mac OS, Mac OS X is based on the same kernel as Unix and has many advanced administrative features and utilities. Though the operating system is much more advanced than earlier versions of the Mac OS, it still has the same ease-of-use that people have come to expect from Apple software.

On January 24, 1984, Apple Computer Inc. (now Apple Inc.) introduced the Macintosh personal computer, with the Macintosh 128K model, which came bundled with what was later renamed the Mac OS, but then known simply as the System Software. The Macintosh is generally credited with popularizing the graphical user interface. The Mac OS has been pre-installed on almost every Macintosh computer sold. The operating system was also sold separately in retail stores. The original

Macintosh system software was partially based on the Lisa OS, previously released by Apple for the Lisa computer in 1983 and, as part of an agreement allowing Xerox to buy shares in Apple at a favorable rate, it also used concepts from the Xerox PARC Xerox Alto, which Steve Jobs and several other Macintosh team members had previewed.

Linux OS
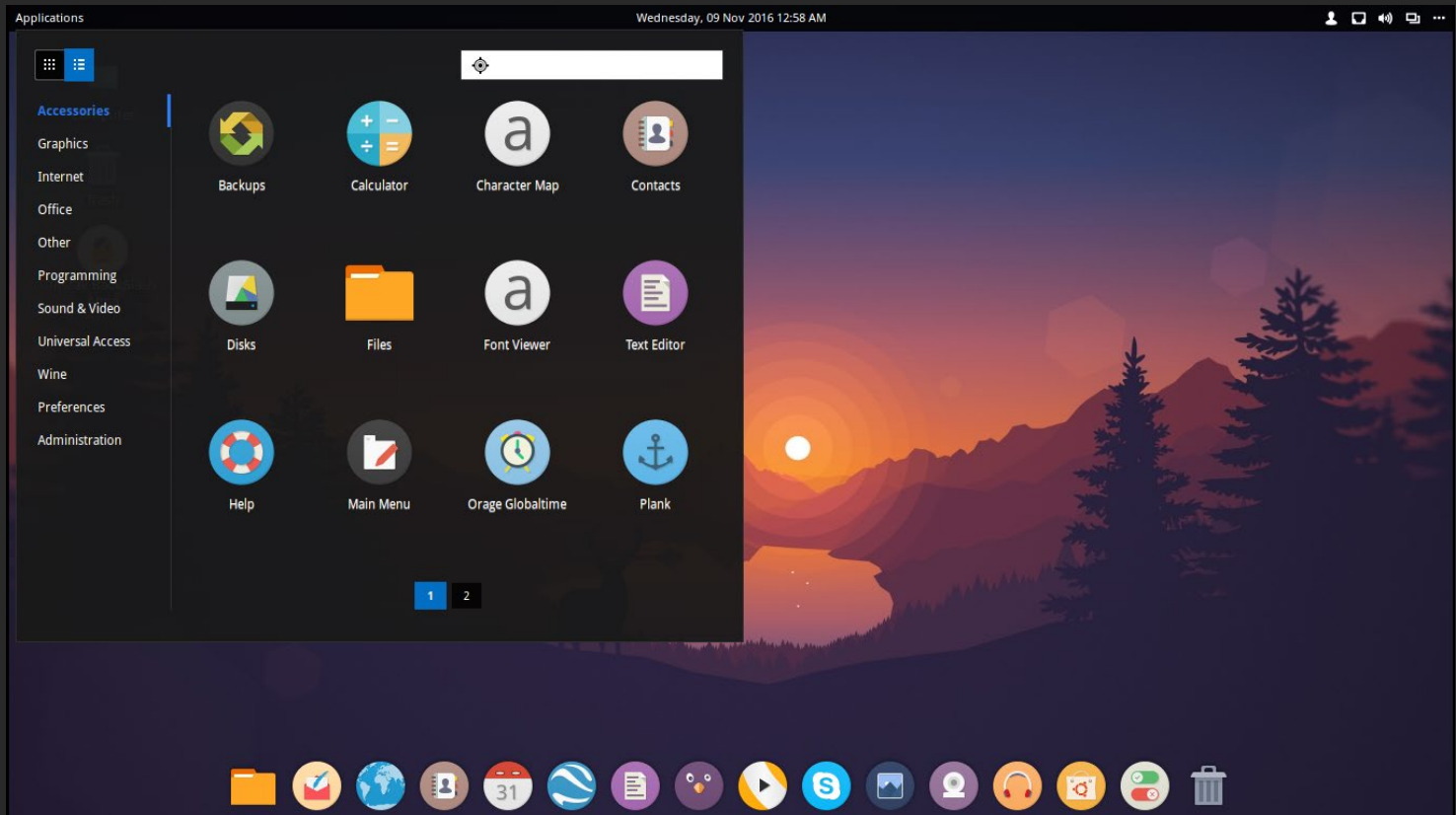
• UNIX development was started in 1969 at Bell Laboratories in New Jersey.
• Bell Laboratories was (1964–1968) involved on the development of a multi-user, timesharing operating system called Multics (Multiplexed Information and Computing System). Multics was a failure. In early 1969, Bell Labs withdrew from the Multics project.
• Bell Labs researchers who had worked on Multics (Ken Thompson, Dennis Ritchie, Douglas McIlroy, Joseph Ossanna, and others) still wanted to develop an operating system for their own and Bell Labs' programming, job control, and resource usage needs.
• When Multics was withdrawn Ken Thompson and Dennis Ritchie needed to rewrite an operating system in order to play space travel on another smaller machine The result was a system called UNICS (UNiplexed Information and Computing Service)
• The first version of Unix was written in the low-level PDP-7(Programmed data process) assembler language. Later, a language called TMG was developed for the PDP-7 by R. M. McClure. Using TMG(TransMoGrifier)to develop a FORTRAN compiler, Ken Thompson instead ended up developing a compiler for a new high-level language he called B, based on the earlier BCPL (Basic Combined Programming Language) language developed by Martin Richard. When the PDP-11 computer arrived at Bell Labs, Dennis Ritchie built on B to create a new language called C. Unix components

were later rewritten in C, and finally with the kernel itself in 1973. Unix V6, released in 1975 became very popular. Unix V6 was free and was distributed with its source code.

• In 1983, AT&T released Unix System V which was a commercial version.

• Meanwhile, the University of California at Berkeley started the development of its own version of Unix. Berkeley was also involved in the inclusion of Transmission Control Protocol/Internet Protocol (TCP/IP) networking protocol.

• The following were the major mile stones in UNIX history early 1980's

• AT&T was developing its System V Unix.

• Berkeley took initiative on its own Unix BSD (Berkeley Software Distribution) Unix.

• Sun Microsystems developed its own BSD-based Unix called SunOS and later was renamed to Sun Solaris.

• Microsoft and the Santa Cruz operation (SCO) were involved in another version of UNIX called XENIX.

• Hewlett-Packard developed HP-UX for its workstations.

• DEC released ULTRIX.

• In 1986, IBM developed AIX (Advanced Interactive eXecutive)

Android OS

Android is a mobile operating system based on a modified version of the Linux kernel and other open source software, designed primarily for touchscreen mobile devices such as smartphones and tablets. It is an operating system for low powered devices that run on battery and are full of hardware like Global Positioning System (GPS) receivers, cameras, light and orientation sensors, Wi-Fi and LTE (4G telephony) connectivity and a touch

screen. Like all operating systems, Android enables applications to make use of the hardware features through abstraction and provide a defined environment for applications.

The platform was created by Android Inc. which was bought by Google and released as the Android Open-Source Project (AOSP) in 2007. Since then, Android has seen numerous updates which have incrementally improved the operating system, adding new features and fixing bugs in previous releases. Each major release is named in alphabetical order after a dessert or sugary treat, with the first few Android versions being called "Cupcake", "Donut", "Eclair", and "Froyo", in that order. During its announcement of Android KitKat in 2013, Google explained that "Since these devices make our lives so sweet, each Android version is named after a dessert". This changed after android pie.

The foundation of the Android platform is the Linux kernel. For example, the Android Runtime (ART) relies on the Linux kernel for underlying functionalities such as threading and low-level memory management. Using a Linux kernel allows Android to take advantage of key security features and allows device manufacturers to develop hardware drivers for a well-known kernel

Apple IOS

iOS, which is a mobile OS, is designed and owned by Apple Inc. It was designed and developed for iPhone, but later extended support for iPad and Apple TV. iOS root comes from Mac OS X, hence it is

UNIX based OS. Like other OS, iOS is frequently updated starting from iOS version 4.0 and the latest is iOS version 5.1. The Core OS layer resides in the bottom of iPhone OS architecture[19]. Core services layer of iOS architecture encompasses an additional abstraction layer, cocoa touch layer and media. The Core OS layer contain the scheduler inclusively, Mach kernel, file system, hardware drivers and control the memory system, network and inter process communication and security framework to secure the system and program data. As confirmed that the core services layer of the OS has an abstraction setup. It also contain nonstop accessibility to the network availability, basic framework for objective-C programming, state of mobile device, access to location information and address book. As of March 2012, 550,000 iOS apps are available in Apple store (Anup, Raman et al 2015). iOS has many benefits and non-benefits as stated below

Merits of iOS
i. Stable and safe Operating System for mobile phones
ii. Probably the most loved interface for any mobile OS in the market. Good looking designed desktop and app icons which go hand to hand with the stunning looks of Apple devices.
iii. Minimal viruses and safe OS with the consideration of very high standard when applications were developed and when updates were also made.

iv. High adherence to current web standard and procedures.
v. High consideration for cloud storage technology.
vi. Easy access to free and premium apps from Apple store.

Demerits of iOS
i.   iOS only support Apple Hardware, and less operability
ii.   Very costly

Symbian OS

Symbian is a mobile operating system developed for smartphones that were originally used for Handheld PCs. It was used by a variety of major brands like Samsung, Motorola, and most of all by Nokia. It was the most popular OS till 2010 when it was replaced by an android. Symbian consists of a variety of layers which most prominently include the User Interface Framework, Application Services, Operating System Services, Base Services, Kernel Services, and Hardware Interface. The core operating system supports a minimal user interface, therefore mainly third parties have been responsible for developing the top interface layer.

These third-party libraries include S60—developed by Nokia, UIQ—developed by Sony Ericsson, and MOAP— developed by NTT DoCoMo. User applications reside typically on top of S60, UIQ, or MOAP. Java Micro Edition libraries exist as separate components in the operating system.

Symbian OS layers are divided into blocks and sub-blocks. Layers represent a basic structural characterization of the OS as a whole while blocks correspond to specific technical domains within a layer. For instance, the OS services layer contains a communication services block which is further decomposed into Telephony, Short Link, and Networking Services sub-blocks. All Symbian OS releases from v7.0 to v9.3 have the same layer decomposition.

Tizen OS

In 2005, Nokia developed a Debian GNU-Linux based platform that includes Maemo operating system and Software Development Kit (SDK). Later in February 15, 2010 Nokia and Intel Corporation announced the merging of Maemo software platform and Moblin "mobile Linux" of Intel and was named MeeGo. In February 11, 2011, almost one year after, Nokia partnered with Microsoft to create a global mobile ecosystem and chose Windows Operating System (OS) to run on Nokia devices. Since Nokia partnered with Microsoft, Intel has been without a major mobile hardware partner the reason Intel abandoned MeeGo in favor of Tizen. On the other hand, in February 25, 2013 Samsung officially announced that they are retiring their Bada operating system (bada means "ocean in Korean") and merged it into Tizen. Today, Linux Foundation is hosting Tizen while its development will be completely open and lead by technical team composed of Intel and Samsung

Tizen is an open and flexible operating system. The name Tizen combines the connectivity of "Tie", the activity of "Rise", and the meditative qualities of "Zen" retrieved from Tizen is an open source

operating system that encourages community innovation and enables full UX design. This OS is created for more than just smart phones. It has a cross-architecture for multiple categories initially on smart phones, tablets and automotive infotainment with other electronic device

Tizen have multiple profiles to cater almost every industry. From smart phones, tablets, wearables, up to vehicles, bio and banks. According to J.K. Shin -CEO, Samsung Electronics "There are many convergences not only among IT gadgets, including smartphones, tablets, PCs, and cameras, but also among different industries like cars, bio, or banks". Tizen's current profiles are Tizen IVI (In vehicle Infotainment), Tizen mobile, Tizen TV, and Tizen Wearables. These profiles are built on top of Tizen Common, which is a shared infrastructure. Manufacturers are free to modify one of these profiles to satisfy their business requirements, or they can develop their own profile utilizing Tizen common shared infrastructure for memory processing and power consumption to fit in their needs. For application developers, it offers HTML5 and native APIs written in C/C++.Tizen will not only be the operating system of everything. It is also the chosen platform of Samsung Electronics to support their vision of Internet of Things (IoT). It is an idea that every device you have and even products that you don't normally expect to see technology will be connected and communicating with each other.

Blackberry OS

In the period 1984 to 2007 Blackberry was extremely successful in their launches of innovative products and services. During this period we can see a clear pattern in the adaptive cycle of Blackberry. Their secure data connection networks where exploited, and conserved which made the company a key player in enterprise communication. Soon, these technologies where 'released' and through innovation and reorganization their products where significantly improved, even new products were introduced like the pager, and the BBM messenger service for consumers. A cycle that Blackberry

used to steadily improved their mobile communication businesses. This made them an incredibly valuable company in 2007. Also, in 2007 Apple introduced the iPhone with which Apple claims to have 'reinvented the phone'. This reinvention was a well thought product learned greatly from the success of the largest players in the business. During this introduction of the iPhone, cyclic adaption misalignment occurred for Blackberry. I define cyclic adaptation misalignment as the situation in which a business lags one or more phase behind on their competitors in the adaptive cycle in the domain of pioneering innovation technologies. Argued is that in a situation of pioneers and innovation, cyclic adaption misalignment causes a company to always be one step behind the competition and therefore miss out on many opportunities and therefore lose market share. This happened at Blackberry when the iPhone was launched, an innovative mobile connectivity device which offered many of the desired features. The iPhone brought some crucial innovations that the blackberry lacked. The first is design. The 2007 iPhone was successfully designed to be extremely user friendly and intuitive. Google, introduced their android platform, and started to focus on designing a user centered interface for their operating system. It was not until 2008 that Blackberry introduced the Blackberry Storm in an attempted to create a device that was designed to give the user an optimal experience through intuitive interfaces and device design. But it was flawed and unsuccessful. A year later, blackberry reached their 'reorganization' step of the adaptive cycle and introduced their Blackberry Storm innovation. However, at this point the competition (Apple & Google) where already in the next cycle of adaptation. Secondly, in 2008 Google introduced their Play store. A virtual store in which users could purchases application that they desired on their mobile device. In that same year, Apple also introduced the similar App store. Both focused in on increasing the number and quality of the available apps a user and download to ensure a good user experience with their devices. Again clear trend is visible in which these companies introduce radical new innovations which they continue to exploit. Blackberry did not.

Ubuntu OS

Before the development of the Linux system in 1987, Andrew Tanenbaum, Professor of Computer Science, has created the first open source software, based on UNIX-style MINIX organizer. Torvalds focused on the source code and established the freely new operating system called LINUX. Linus Torvalds, a Finnish computer science student at the University of Helsinki, wrote the first Linux program in 1991. After a few years, most people contributed to Linux development. As a result, Linux is redistributed again for performing various purposes. Linux gained a good reputation rapidly since the source code is freely available, and the terms of license for developers are flexible. (Linuceum, 2010)

The word "Ubuntu" is taken from an ancient Zulu and Xhosa (African) word, which means "humanity to others". In addition, it means, "I am what I am because of who we all are". This word was selected because these passions accurately represent the spirit of the Ubuntu Linux distribution. (Techotopia, 2014)

As mentioned before, Ubuntu is one of the most common and used Linux distros. Ubuntu is made up by a source code that originated from another earlier Linux version called Debian. Although, Debian is a valuable operating system, it became unpreferred by some of Linux users because of its irregular updates and its unfriendly user maintenance and installation. (Techotopia, 2014)

Accordingly, a South African internet mogul called Mark Shuttleworth, decided to make some modification on Debian distribution for a more user-friendly Linux distribution. He redistributes a new Linux version and gives it the name "Ubuntu". Afterwards, he established a company called Canonical Ltd to support and promote the Ubuntu Linux. Moreover, Shuttleworth has taken the responsibility to form and fund a foundation for guaranteeing the future of Ubuntu. (Techotopia, 2014)

Then, Ubuntu has since got strengthen rapidly. Some hardware vendors nowadays such as Dell ship computers pre-loaded with Ubuntu Linux. Canonical Company publishes an interim release of Ubuntu every six months between LTS versions.
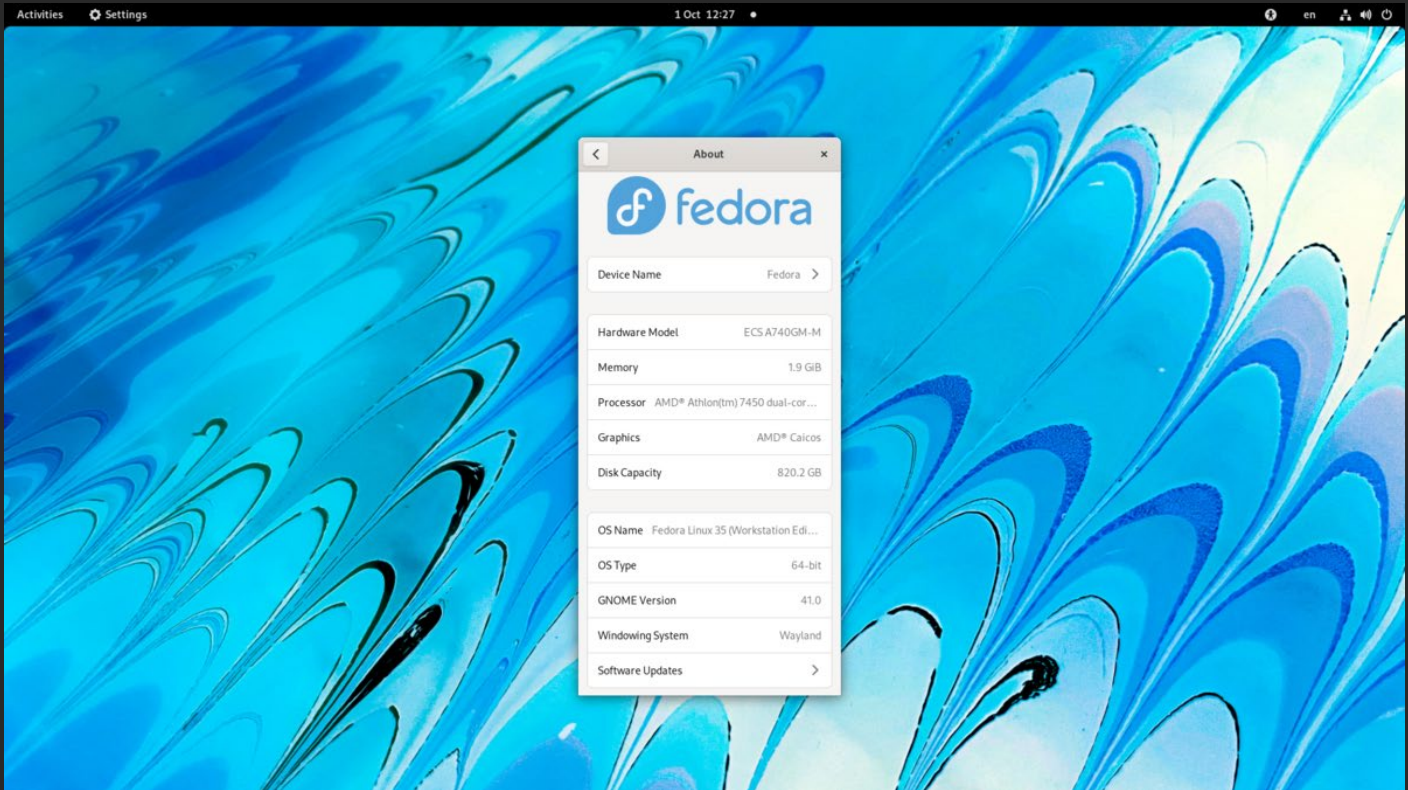
Fedora OS

Sion Fedora Linux is a Linux distribution developed by the community-supported Fedora Project which is sponsored primarily by Red Hat, a subsidiary of IBM, with additional support from other companies. Fedora contains software distributed under various free and open-source licenses and aims to be on the leading edge of free technologies. Fedora is the upstream source of the commercial Red Hat Enterprise Linux distribution. Fedora Linux is a fork of Red Hat Linux since RHL was discontinued in 2003.

Since the release of Fedora 30, five different editions are currently available: Workstation, focused on the personal computer, Server for servers, CoreOS, focused on cloud computing, Silver blue, focused on an immutable desktop specialized to container-based workflows and IoT, focused on IoT devices.

As of February 2016, Fedora Linux has an estimated 1.2 million users, including Linus Torvalds (as of May 2020), creator of the Linux kernel.

Fedora has a reputation for focusing on innovation, integrating new technologies early on and working closely with upstream Linux communities. Making changes upstream instead of specifically for Fedora Linux ensures that the changes are available to all Linux distributions.

Fedora Linux has a relatively short life cycle: each version is usually supported for at least 13 months, where version X is supported only until 1 month after version X+2 is released and with approximately 6 months between most versions. Fedora users can upgrade from version to version without reinstalling.

The default desktop environment in Fedora Linux is GNOME and the default user interface is the GNOME Shell. Other desktop environments, including KDE Plasma, Xfce, LXQt, LXDE, MATE, Cinnamon, and i3 are available and can be installed.

A Live USB drive can be created using Fedora Media Writer or the dd command.[24] It allows users to try Fedora Linux without making changes to the hard disk

FreeBSD OS

There are countless OS out on this planet on the current time, nevertheless as you are going to have bought traditionally realized or would wager some are better than others. For illustration Microsoft's windows is virtually nearly essentially the most well well-known and most used OS out available on the market at the second. Nevertheless simply on the grounds that it's the one who's most famous and used does not imply it'll have a excessive-high-quality. Comfortably there are numerous one-of-

a-kind OS which in most cases is much better. Nevertheless, every OS is better for its possess segment, though some are overall better. Microsoft's windows is among the most "user-friendly" however it is not very robust. Nevertheless, FreeBSD is individual friendly (assuming that the man or woman is conscious of whatever about laptop packages) and is vastly potent and rather consistent. Two elements that Microsoft's home windows does now not have. Some matters that make FreeBSD a greater working approach than others out to be had in the marketplace, good the first and essential is the ports tree FreeBSD has, it's FreeBSD headquartered, and has an awfully customizable kernel for the core of the process. Around 1990 an advert company, BSD, divided BSD Net/2 to make BSD/386 0.3.2. This was marketed as a UNIX operating system and an acceptable, although greatly cheap compared to AT&T's System V. whereas BSD code had regularly been freely distributable, a license was still needed from AT&T. Pssst... we can write an original essay just for you. Any subject. Any type of essay. We'll even meet a 3-hour deadline. Get your price 123 writers online About 1992 AT&T filed a causa against BSDi for "trademark infringement, false advertising and unfair competition. This was fired by the magistrate a month later however AT&T filed once more, now against BSDi with the University of California. The following may be a quote from the official complaint: "Substantial parts of the ASCII text file embodied within the Networking unharness two computer code and its BSDI spinoff, BSD/386 supply, area unit primarily based upon, well traced from or derived from original UNIX(R) system ASCII text file disclosed in confidence to the Regents underneath restrictive license agreements." In core AT&T were querulous a few little variety of files that were getting used and distributed in violation of their license — specifically that the end-user was needed to pay the license tax. Before the proceedings were resolved AT&T

sold-out off USL (and thus the UNIX operating system trademark and every one claims), which was eventually bought by Novell in 1993. The causa was finally resolved on 2/4/1994 – as a result a four.4BSD nonfat was created, that was a non-functional version of four.4BSD-Encumbered (which was created obtainable for license holders).

Solaris OS
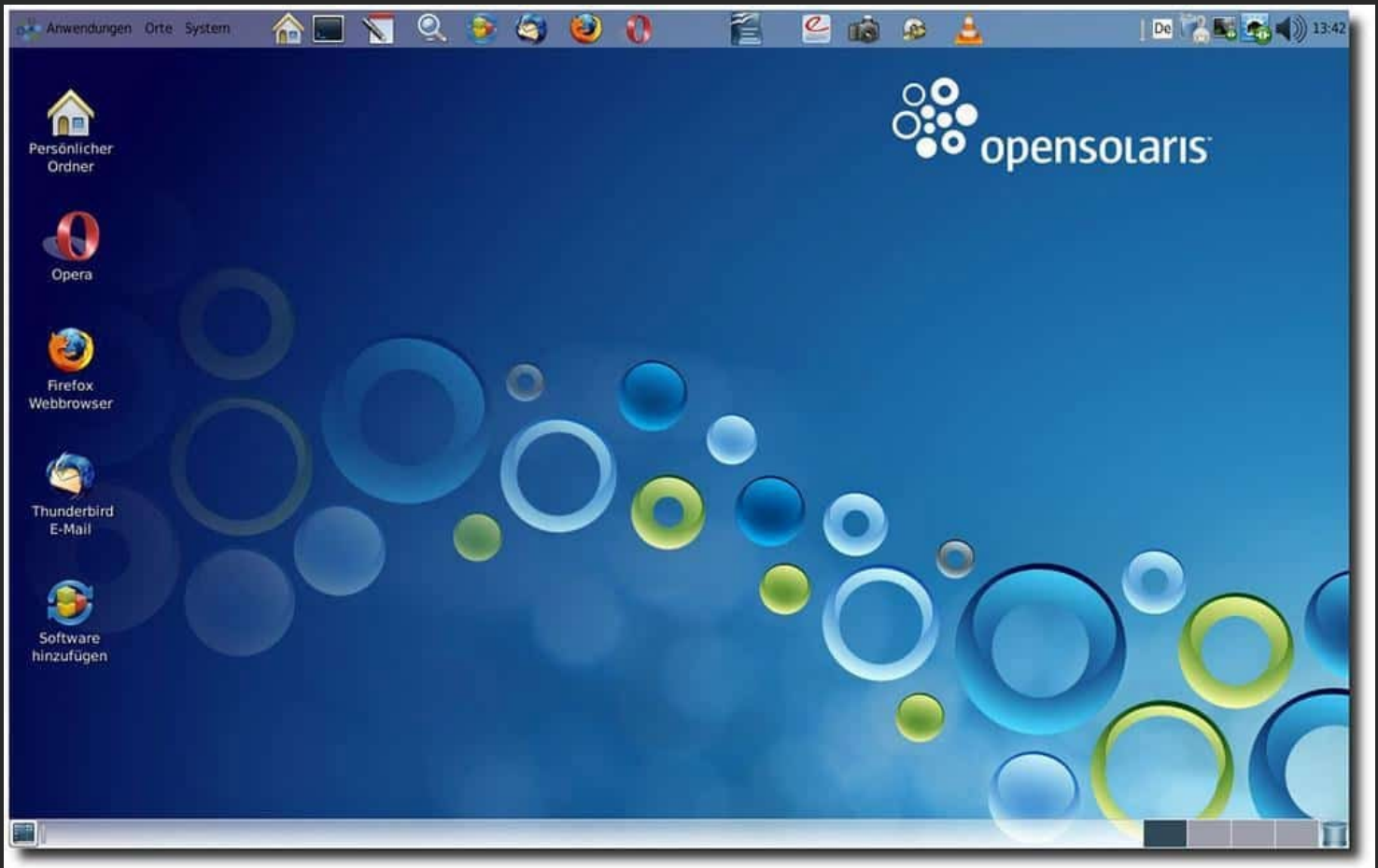
Solaris is the UNIX-based operating system of Sun Microsystems with roots in the BSD operating system family. Up to the version 3.x this operating system was called SunOS, this name was kept into the internal release information of current Solaris versions. The first version of SunOS was published in 1982. With the version 4.0 the new product name Solaris was introduced for SunOS releases as of 1989. The operating system Solaris 2.0 (SunOS 5.0) basing on the UNIX system V release 4 was published in July 1992.

The installation package of Solaris 8 (SunOS 5.8) is delivered on several CDs which include the operating system, applications and the documentation. With the Solaris Webstart 3.0 Installer Solaris can be installed comfortably on a prepared harddisk partition with at least 2 gbyte of free space. The Installer divides the partition into one boot partition (10 mbyte of size) and the Solaris System area inclusive swap area.

The Primary boot subsystem VSN 2.0 proceeds after the Installation as a booting manager. After the booting procedure the CDE or optionally OpenWindow system is available as a GUI. Solaris fulfils the Open Group Unix98 specification. With the available Solaris Security Toolkit application it is possible to made specific protection settings for Solaris.

Field of Application

- CAD (computer aided design) applications

- Stable system for databases, data centre

- Intranet server as well as Internet or file server, Internet client

Structure information

- Multi-processor capable of up to 8 CPUs (Kernel limited to 21 CPUs)

- UNIX derivat

- Realtime OS (timing up to 1 nanosecond)

- 64-bit operating system (UltraSparc), 32-bit on x86, (Intel)

- Monolithic Kernel

System Environment

- Optional CDE 1.4 or Open Windows 6.4.1

- SPARC platform and Intel processors, PowerPC

- supports new hardware technologies like USB, FireWire, SCSI, Hot Plug, ACPI

- Scalability: more than of 4 gbyte RAM, max. 64 CPUs

- File system: UFS (0x83), logging of all writing processes, protection against inconsistencies

- Read/Write: FAT, FAT32, ISO9660

- Java support, Perl integrated for CGI programming among others

Chrome OS

Chrome OS (sometimes styled as chromeOS) is a Gentoo Linux-based operating system designed by Google. It is derived from the free software Chromium OS and uses the Google Chrome web browser as its principal user interface. Unlike Chromium OS, Chrome OS is proprietary software.

Google announced the project, based on Ubuntu, in July 2009, conceiving it as an operating system in which both applications and user data reside in the cloud: hence Chrome OS primarily runs web applications. Source code and a public demo came that November. The first Chrome OS laptop, known as a Chromebook, arrived in May 2011. Initial Chromebook shipments from Samsung and Acer occurred in July 2011.

Chrome OS has an integrated media player and file manager. It supports Progressive Web Apps and Chrome Apps; these resemble native applications, as well as remote access to the desktop. As more Chrome OS machines have entered the market, the operating system is now seldom evaluated apart from the hardware that runs it.

Android applications started to become available for the operating system in 2014, and in 2016, access to Android apps in Google Play's entirety was introduced on supported Chrome OS devices. Support for a Linux terminal and applications, known as Project Crostini, was released to the stable channel in 2018 with Chrome OS 69. This was made possible via a lightweight Linux kernel that runs containers inside a virtual machine.

Chrome OS is only available pre-installed on hardware from Google manufacturing partners, but there are unofficial methods that allow it to be installed on other equipment. Its open-source upstream, Chromium OS, can be compiled from downloaded source code. Early on, Google provided design goals for Chrome OS, but has not otherwise released a technical description.

Cent OS

CentOS (Community Enterprise Operating System; also known as CentOS Linux) is a Linux distribution that provides a free and open-source community-supported computing platform, functionally compatible

with its upstream source, Red Hat Enterprise Linux (RHEL). In January 2014, CentOS announced the official joining with Red Hat while staying independent from RHEL, under a new CentOS governing board.

The first CentOS release in May 2004, numbered as CentOS version 2, was forked from RHEL version 2.1AS. Since version 8, CentOS officially supports the x86-64, ARM64, and POWER8 architectures, releases up to version 6 also supported the IA-32 architecture. As of December 2015, AltArch releases of CentOS 7 are available for the IA-32 architecture, Power ISA, and for the ARMv7hl and AArch64 variants of the ARM architecture. CentOS 8 was released on 24 September 2019.

In December 2020, Red Hat unilaterally terminated CentOS development In response, CentOS founder Gregory Kurtzer created the Rocky Linux project as a successor to the original mission of CentOS. In March 2021, Cloud Linux (makers of CloudLinux OS) released a new RHEL derivative called AlmaLinux.

While the distribution was discontinued at the end of 2021, development of CentOS Stream, its midstream variant, continues.

Debian OS

Debian GNU/Linux, is a GNU/Linux distribution composed of free and open-source software, developed by the community-supported Debian Project, which was established by Ian Murdock on August 16, 1993. The first version of Debian (0.01) was released on September 15, 1993, and its first stable version (1.1) was released on June 17, 1996. The Debian Stable branch is the most popular edition for personal computers and servers. Debian is also the basis for many other distributions, most notably Ubuntu.

Debian is one of the oldest operating systems based on the Linux kernel. The project is coordinated over the Internet by a team of volunteers guided by the Debian Project Leader and three foundational documents: the Debian Social Contract, the Debian Constitution, and the Debian Free Software Guidelines. New distributions are updated continually, and the next candidate is released after a time-based freeze.

Since its founding, Debian has been developed openly and distributed freely according to the principles of the GNU Project. Because of this, the Free Software Foundation sponsored the project from November 1994 to November 1995. When the sponsorship ended, the Debian Project formed the nonprofit organization Software in the Public Interest to continue financially supporting development.


Deepin OS

Linux Deepin and Hiweed Linux) is a Linux distribution based on Debian's stable branch. It features DDE, the Deepin Desktop Environment, built on Qt and available for various distributions. As of version 15.10 it also uses dde-kwin, a set of patches for KDE Plasma's window manager. In 2019, Huawei started to ship Linux laptops pre-installed with Deepin. Deepin's userbase is predominately Chinese, though it is in most prominent Linux distributions' repositories as an alternative desktop environment. It is developed in Wuhan, China by Deepin Technology, as of 1 January 2020, a wholly owned subsidiary of UnionTech.

The distribution began in 2004 as Hiweed Linux. In 2011, the development team behind Deepin established a company named Deepin Technology to support commercial development of the operating system. The company received business investments the same year it was founded.

Deepin Technology joined the Linux Foundation in 2015. Deepin ships a mix of open-source and proprietary programs such as Google Chrome, Spotify and Steam. It also includes a software suite of applications developed by Deepin Technology, as well as WPS Office, 360 Security Guard, CodeWeavers' CrossOver and many others.

The development of Deepin is led by China-based Deepin Technology Co., Ltd. The company generates revenue through the sale of technical support and other services related to it. As of 1 January 2020, Deepin Technology is a wholly owned subsidiary of UnionTech. Deepin features its own desktop environment called Deepin DE or DDE for short. It is written in Qt. The distribution also maintains their own Window Manager dde-kwin. The desktop environment was described as "the single most beautiful desktop on the market" by Jack Wallen writing for TechRepublic. The DDE is also available in the software repositories of Fedora 30.

UbuntuDDE and Manjaro Deepin are community-supported distributions, that feature the Deepin Desktop Environment and some of the deepin applications. It is also possible to install DDE (Deepin Desktop Environment) on Arch Linux.
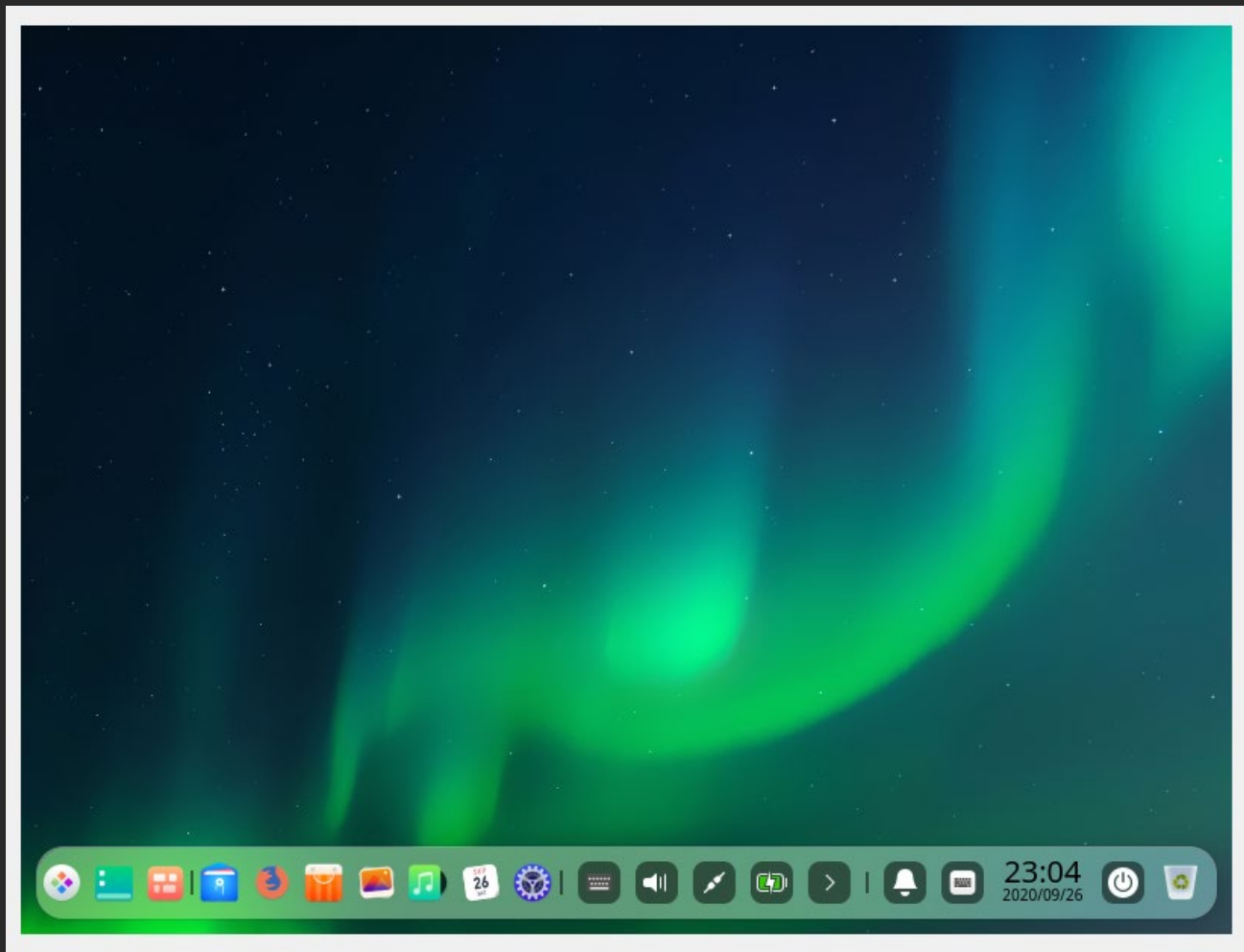
Fire OS

Fire OS is a mobile operating system based on the Android Open Source Project and created by Amazon for its Fire tablets, Echo smart speakers and Fire TV devices. It includes proprietary software, a customized user interface primarily centered on content consumption, and heavy ties to content available from Amazon's own storefronts and services. Apps for Fire OS are provided through the Amazon Appstore

Amazon only began referring to the Android derivative as Fire OS with its third iteration of Fire tablets. Unlike previous Fire models, whose operating system is listed as bei Fire OS uses a customized user interface designed to prominently promote content available through Amazon services, such as Amazon Appstore, Prime Video, Amazon Music & Audible, and Kindle Store. Its home screen features a carousel of recently accessed content and apps, with a "favorites shelf" of pinned apps directly below it. Sections are provided for different types of content, such as apps, games, music, audiobooks, and video among others. A search function allows users to search through their local content library or Amazon's stores. Similarly to Android, sliding from the top of the screen exposes quick settings and notifications. Fire OS also provides integration with Goodreads, Facebook, and Twitter. X-Ray is also integrated into its playback functions, allowing users to access supplemental information on what they are currently viewing. The OS features a user system, along with Kindle Free Time, a suite of parental controls which allow parents to set time limits for using certain types of content. Another feature is Amazon Game Circle, which is a retired online multiplayer social gaming network released by Amazon. It allowed players to track their achievements and compare their high scores on a leader board. It debuted in July 2012[26] and was retired September 5, 2018ng "based on" Android, the "Fire OS 3.0" operating system is listed as being "compatible with" Android

Harmony OS

Harmony is a distributed operating system developed by Huawei to run on multiple devices. In a multi-kernel design, the operating system selects suitable kernels from the abstraction layer for devices with

diverse resources For IoT devices, the system is known to be based on LiteOS; while for smartphones and tablets, it is based on a Linux kernel and has used the open-source Android code to support running Android apps, in addition to HarmonyOS apps.

The system includes a communication base DSoftBus for integrating physically separate devices into a virtual Super Device, allowing one device to control others and sharing data among devices with distributed communication capabilities. It supports several forms of apps, including the apps that can be installed from AppGallery on smartphones and tablets, installation-free Quick apps and lightweight Atomic Services accessible by users.

HarmonyOS was first used in Honor smart TVs in August 2019 and later used in Huawei smartphones, tablets and smartwatches in June 2021


Remix OS

Remix OS was a computer operating system for personal computers with x86 and ARM architectures that, prior to discontinuation of development, shipped with a number of 1st- and 3rd-party devices. Remix OS allowed PC users to run Android mobile apps on any compatible Intel-based PC.

In January 2016 Jide announced a beta version of their operating system called Remix OS for PC, which is based on Android-x86 — a x86-port of the Android operating system — and available for download for free from their website. The beta version of Remix OS for PC brings hard drive installation, 32-bit support, UEFI support and OTA updates. Except for the free software licensed parts available on GitHub, unlike Android-x86, the source code of Remix OS is not available to the public.

Google Mobile Services (GMS) were removed from the Remix Mini after Remix OS Update: 3.0.207which Jide claimed was to "ensure a consistent experience across all Android devices for all."Later comments suggest that there was a compatibility issue with some apps which resulted in Google requesting that GMS not be pre-loaded.

On July 17, 2017, Jide announced that development of Remix OS for PC, as well as related consumer products in development, was being discontinued, stating that the company would be "restructuring [their] approach to Remix OS and transitioning away from the consumer space"
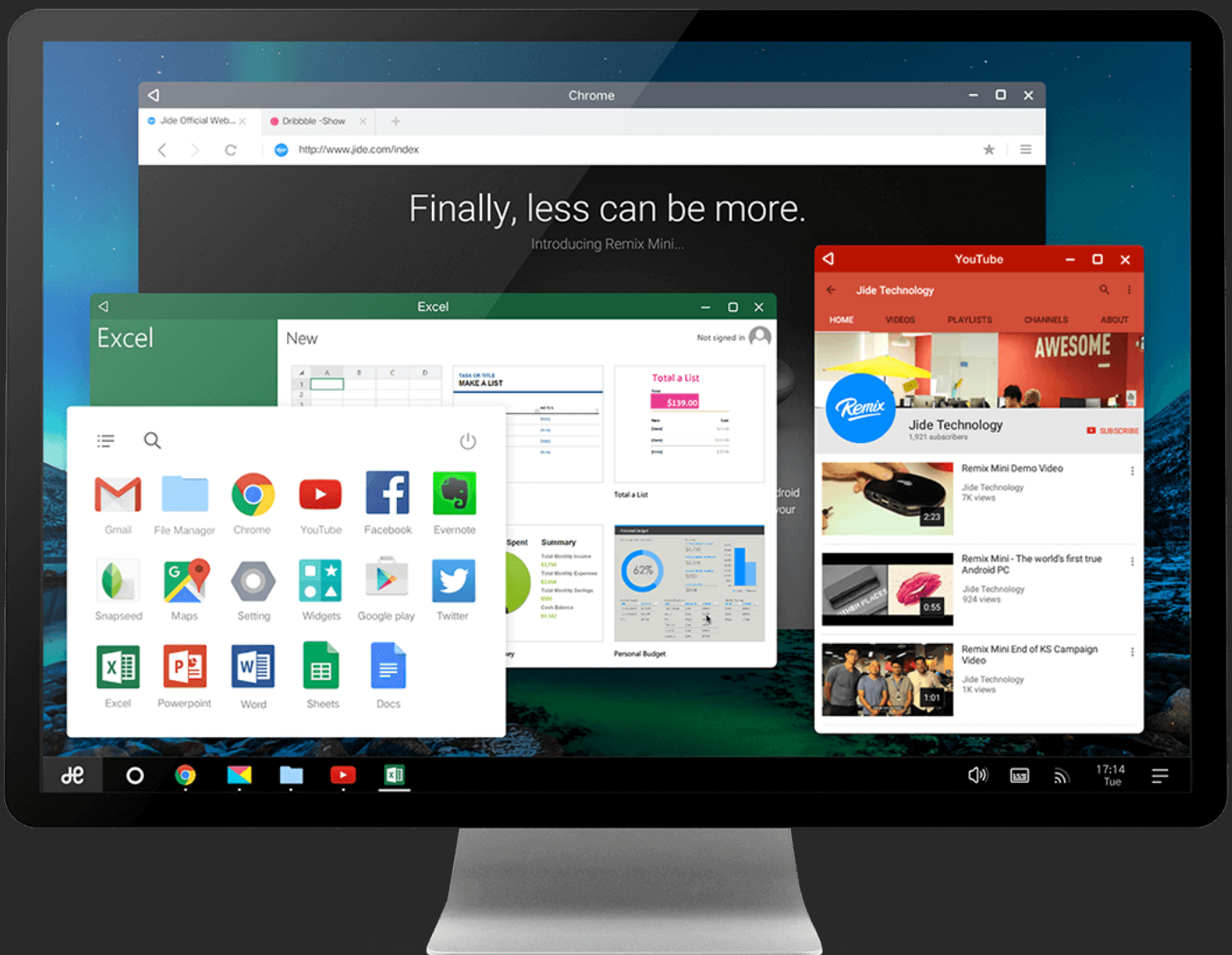
Sailfish OS

Sailfish OS is a Linux-based operating system based on free software, and open source projects such as Mer as well as including a closed source UI. The project is being developed by the Finnish company Jolla.

The OS first shipped with the original Jolla Phone in 2013 (its sale stopped in 2016, but it was supplied with software updates until the end of 2020), then the Jolla Tablet in 2015 and from other vendors licensing the OS. The OS is ported by community enthusiasts to third-party mobile devices including smartphones and tablet computers. Sailfish OS can be used for many kinds of devices.

he OS is an evolved continuation of the Linux MeeGo OS previously developed by alliance of Nokia and Intel which itself relies on combined Maemo and Moblin. The MeeGo legacy is contained in the Mer core in about 80% of its code; the Mer name thus expands to MEego Reconstructed. This base is extended by Jolla with a custom user interface and default applications. Jolla and MERproject.org follow a meritocratic system to avoid the mistakes that led to the MeeGo project's then-unanticipated discontinuation.
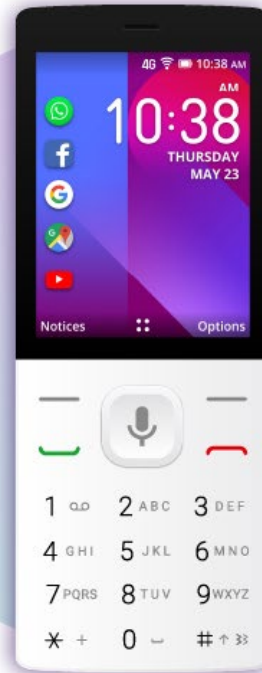

Kai OS

KaiOS is a mobile operating system, based on Linux, for keypad feature phones. It is developed by KaiOS Technologies (Hong Kong) Limited; a company based in Hong Kong, with largest shareholder being Chinese multinational electronics conglomerate TCL Corporation. KaiOS is forked from B2G OS (Boot to Gecko OS), an open-source community-driven fork of Firefox OS, which was discontinued by Mozilla in

The primary features of KaiOS bring support for 4G LTE E, VoLTE, GPS, and Wi-Fi; with HTML5-based apps and longer battery life to non-touchscreen devices with optimized user interface, less memory and energy consumption. It also features over-the-air updates (OTA updates). A dedicated app marketplace (KaiStore) enables users to download mobile applications, or 'apps'. Some services are preloaded as HTML5 applications, including Facebook and YouTube. As of 1 April 2020, there are 500+ apps in KaiStore. The mobile operating system is comparatively lightweight on hardware resource usage, and is able to run on devices with just 256 megabytes (MB) of memory.

The operating system was first released in 2017, and is developed by KaiOS Technologies Inc., a Hong Kong-based company headed by CEO Sebastien Codeville, with offices in other countries. In June 2018, Google invested US$22 million in the operating system. India-based telecom operator Reliance Jio also invested $7 million for a 16% stake in the company. In May 2019, KaiOS raised an additional US$50 million from Cathay Innovation, and previous investors Google and TCL Holdings.

In market share study results announced in May 2018, KaiOS beat Apple's iOS for second place in India, while Android dominates with 71%, albeit down by 9%. KaiOS growth is being largely attributed to the popularity of the competitively-priced JioPhone. In Q1 2018, 23 million KaiOS devices were produced.

In March 2020, Mozilla and KaiOS Technologies announced a partnership to update KaiOS with a modern version of the Gecko browser engine, and more closely aligned testing infrastructure. This change should give KaiOS four years worth of performance and security improvements and new features,

including TLS 1.3, WebAssembly, WebGL 2.0, Progressive Web Apps, new video codecs like WebP, AV1, and modern JavaScript and Cascading Style Sheets (CSS) features.

Lynx OS

   The first versions of LynxOS were written in 1986 in Dallas, Texas, by Mitchell Bunnell and targeted at a custom-built Motorola 68010-based computer. The first platform LynxOS ever ran on was an Atari 1040ST with cross development done on an Integrated Solutions UNIX machine. In 1988-1989, LynxOS was ported to the Intel 80386 architecture. Around 1989, ABI compatibility with System V.3 was added. Compatibility with other operating systems, including Linux, followed.

Full Memory Management Unit support has been included in the kernel since 1989, for the reliability of protected memory and the performance advantages of virtual addresses. The PowerPC architecture is also supported, and in February 2015 Lynx announced planned support for the ARM Cortex A-family.

LynxOS components are designed for absolute determinism (hard real-time performance), which means that they respond within a known period of time. Predictable response times are ensured even in the presence of heavy I/O due to the kernel's unique threading model, which allows interrupt routines to be extremely short and fast.

In 2003, Lynx introduced a specialized version of LynxOS called LynxOS-178, especially for use in avionics applications that require certification to industry standards such as DO-178B.

The Usenet newsgroup comp.os.lynx is devoted to discussion of LynxOS.

Pike OS

PikeOS is a commercial, hard real-time operating system (RTOS) that offers a separation kernel based hypervisor with multiple logical partition types for many other operating systems (OS), each called a GuestOS, and applications. It enables users to build certifiable smart devices for the Internet of things (IoT) according to the high quality, safety and security standards of different industries. For safety and security critical real-time applications on controller-based systems without memory management unit (MMU) but with memory protection unit (MPU) PikeOS for MPU is available.

PikeOS combines a real-time operating system (RTOS) with a virtualization platform and Eclipse-based integrated development environment (IDE) for embedded systems. It is a commercial clone of L4 microkernel family. PikeOS has been developed for safety and security-critical applications with certification needs in the fields of aerospace, defense, automotive, transport, industrial automation, medical, network infrastructures, and consumer electronics.
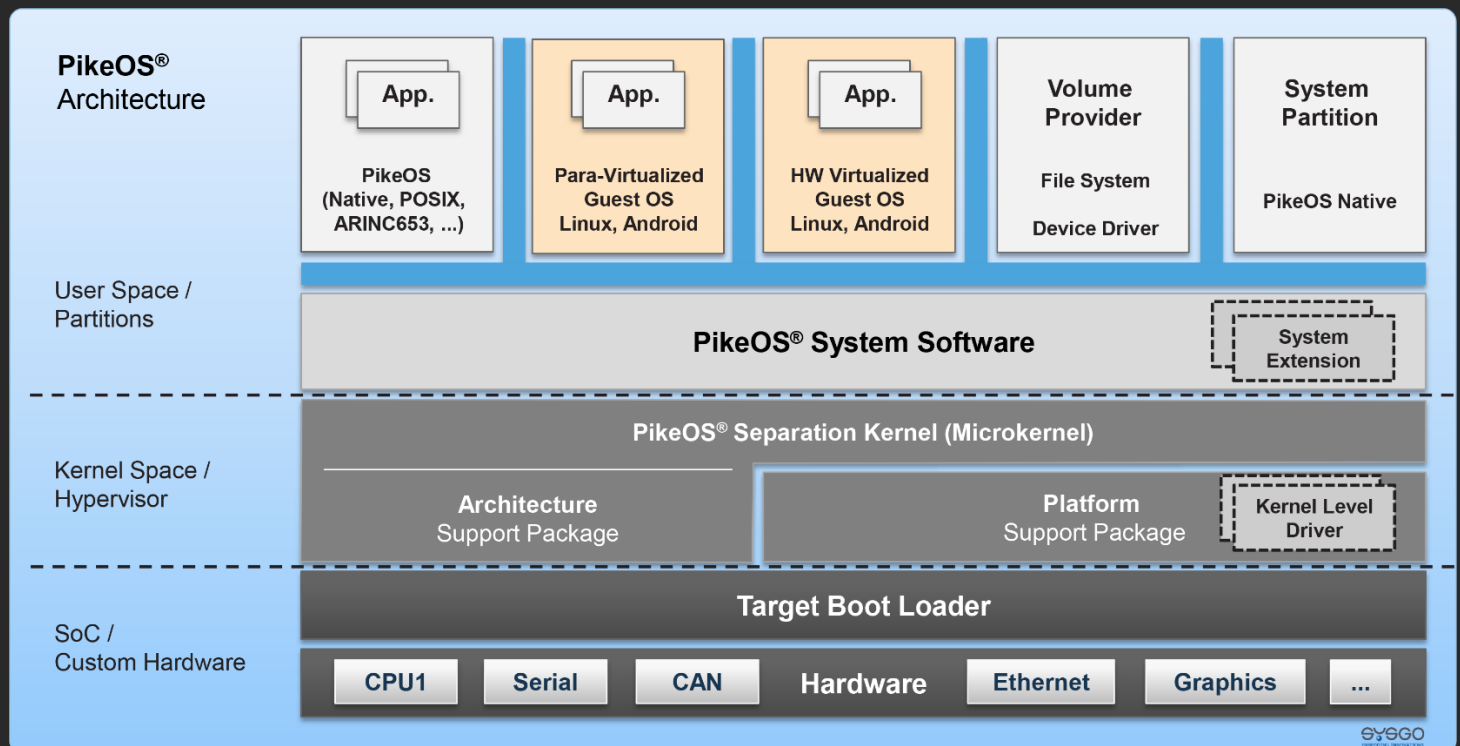
A key feature of PikeOS is an ability to safely execute applications with different safety and security levels concurrently on the same computing platform. This is done by strict spatial and temporal segregation of

these applications via software partitions. A software partition can be seen as a container with pre-allocated privileges that can have access to memory, central processing unit (CPU) time, input/output (I/O), and a predefined list of OS services. With PikeOS, the term application refers to an executable linked against the PikeOS application programming interface (API) library and running as a process inside a partition. The nature of the PikeOS application programming interface (API) allows applications to range from simple control loops up to full Para virtualized guest operating systems like Linux or hardware virtualized guests.

Sky OS

SkyOS (Sky Operating System) is a discontinued prototype commercial, proprietary, graphical desktop operating system written for the x86 computer architecture. As of January 30, 2009 development was halted with no plans to resume its development. In August 2013, developer Robert Szeleney announced the release of a public beta on the SkyOS website. This allows public users to download a Live CD of the SkyOS operating system, for testing and to optionally install the system.

Development started in 1996 with the first version released in December 1997. Up until version 4.x the OS was freely available. Starting with beta development of SkyOS 5 in 2003, users were required to pay US$30 to get access to beta releases. SkyOS adapted new filesystem SkyFS based on OpenBFS in 2004 and its graphics subsystem was improved in 2006 with support for desktop compositing including double buffering and transparency. The OS also moved to ELF binaries then. The last beta build 6947 was released in August 2008 and there was no status update for several months. As the OS was mainly the work of one man, Robert Szeleney, there was increasing difficulty to add new device drivers. Considering lack of development under Robert Szeleney, going open source was viewed by the tech press as the best option for SkyOS. Although Szeleney tried to bypass the lack of drivers by using a new kernel based on Linux or NetBSD, and reported some progress in this regard, development has not resumed. SkyOS website disappeared in 2013 and final public build from August 2008 was released for free shortly thereafter.

Cosmos OS

 C# Open-Source Managed Operating System (Cosmos) is a toolkit for building operating systems, written mostly in the programming language C# and small amounts of a high level assembly language named X#. Cosmos is a backronym, in that the acronym was chosen before the meaning. It is open-source software released under a BSD license.

Cosmos encompasses an ahead-of-time (AOT) compiler named IL2CPU to translate Common Intermediate Language (CIL) into native instructions. Cosmos compiles user-made programs and associated libraries using IL2CPU to create a bootable native executable that can be run with no support. The resulting output can be booted from a USB flash drive, CD-ROM, over a network via Preboot Execution Environment (PXE), or inside a virtual machine. Recent releases also allow deploying to certain x86 embedded devices over Universal Serial Bus (USB). While C# is the primary language used by developers (both on the backend and by end users of Cosmos), many CLI languages can be used, provided they compile to pure CIL without the use of Platform Invocation Services (P/Invokes). Cosmos is mainly intended for use with .NET Core.
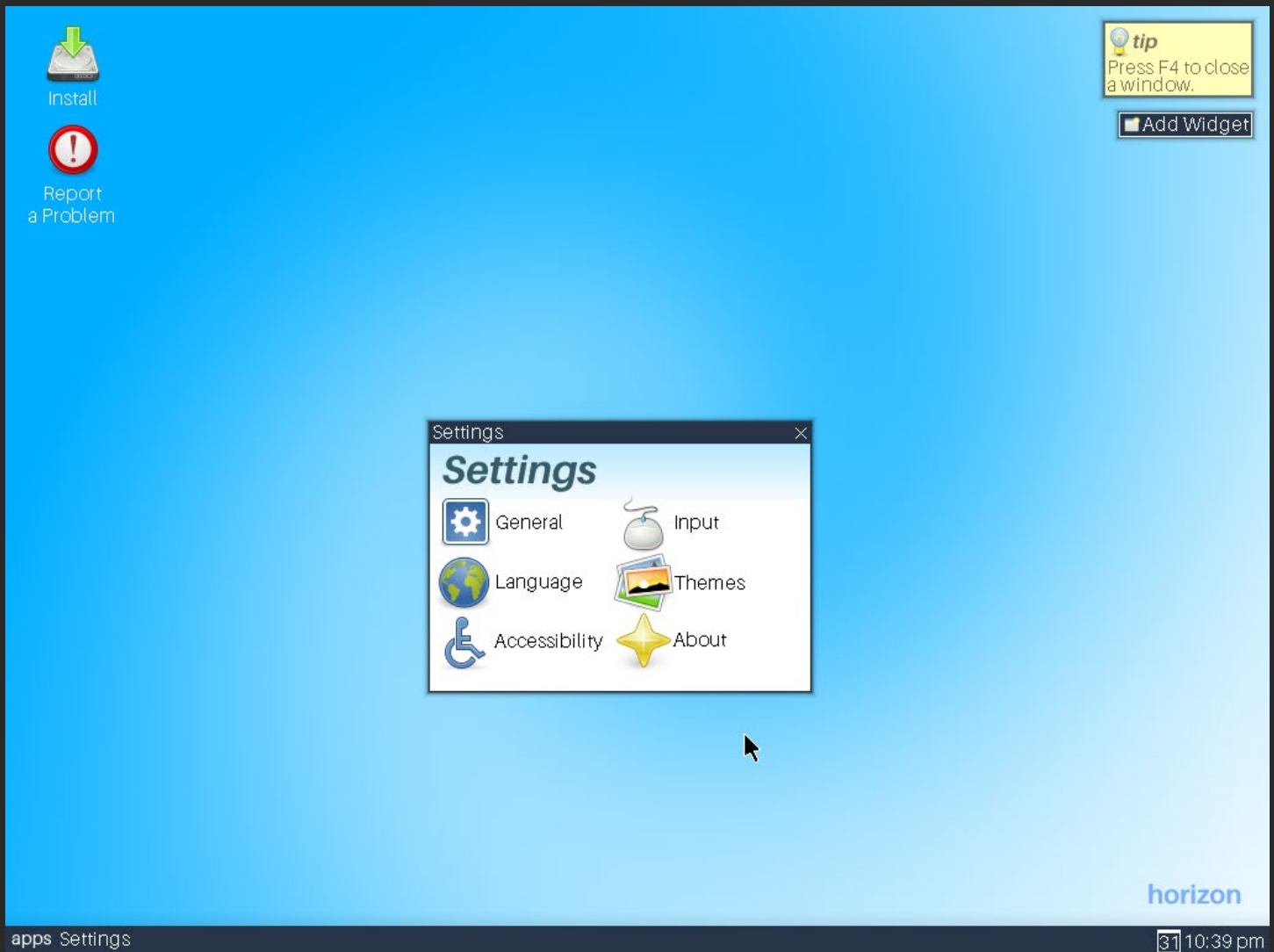
As of 2021, Cosmos does not aim to become a full operating system, but rather a toolkit to allow other developers to simply and easily build their own operating systems using .NET Core. It also functions as an abstraction layer, hiding much of the inner workings of the hardware from the eventual developer.

Ghost OS

Ghost OS is an open-source hobbyist operating system and kernel. It is under development since 2014 and currently compatible with the x86 platform. The system is based on a microkernel and features symmetric multi-processing and multitasking. Most of the kernel and system programs are written in C++.

The architectural concept is a micro-kernel design. Many of the functionalities that are usually integrated in the kernel in a monolithic or hybrid system are implemented as user-level applications. Drivers and some vital components (like the executable loader) are running as such processes. This approach tries to improve stability and avoid crashes due to faulty accesses, hardware uses or memory corruption. There is a user space spawner process used to load executables. The current implementation supports static 32-bit ELF binaries. Dynamic linking is not supported yet.
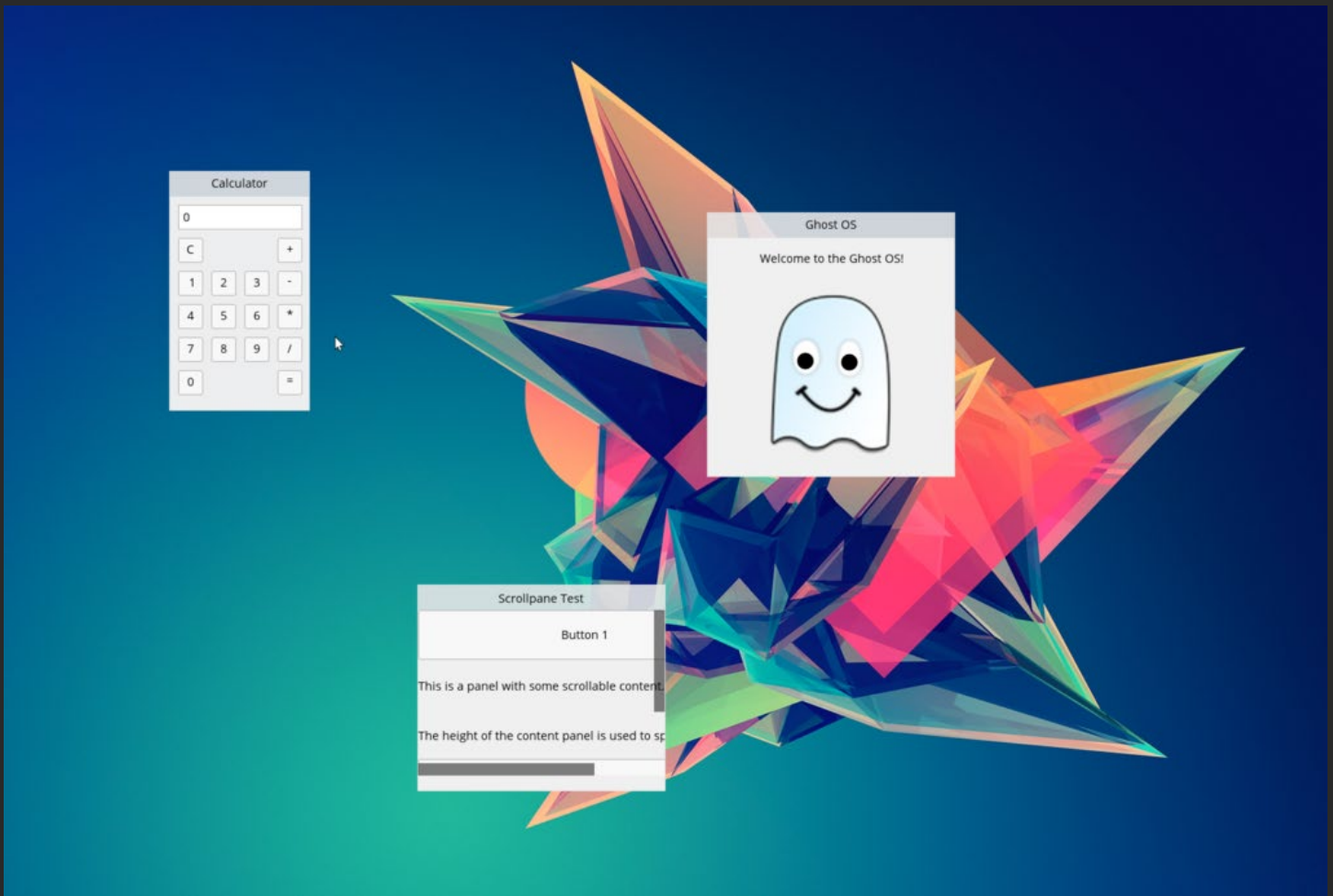
The kernel provides an application programming interface that is used for all inter-process communications and system commands. Driver processes access this interface to manage memory, or request direct resource access. The interface functions are C-compatible.

A custom implementation of the libc is provided. This implementation incorporates the libm from the must C library. libstdc++ is available as a default part when setting up the Ghost specific compiler toolchain.

Phantom OS

Phantom OS is an operating system (OS) made by mostly Russian programmers. It is based on a concept of persistent virtual memory, and uses managed code. It is one of a few OSes not based on classic concepts of Unix-like systems. Its primary goal is to achieve simplicity and effectiveness in both the operating system and application software at the same time. It is free and open-source software (FOSS) released under a GNU Lesser General Public License (LGPL).

Phantom is based on the principle that "Everything is an object", in contrast to the Unix-like approach of "Everything is a file".

Managed code – Memory protection on object level, rather than process level; absence of pointer arithmetic in managed code avoids many problems that exist and occur in unmanaged code.

Global address space – Very effective and inexpensive inter-process communication (IPC). Single (flat) address space allows transfer of objects from one process (application) to another by transferring links to that object. Security is achieved via absence of pointer arithmetic and the inability of an application to get linked to an object other than by calling a public method.
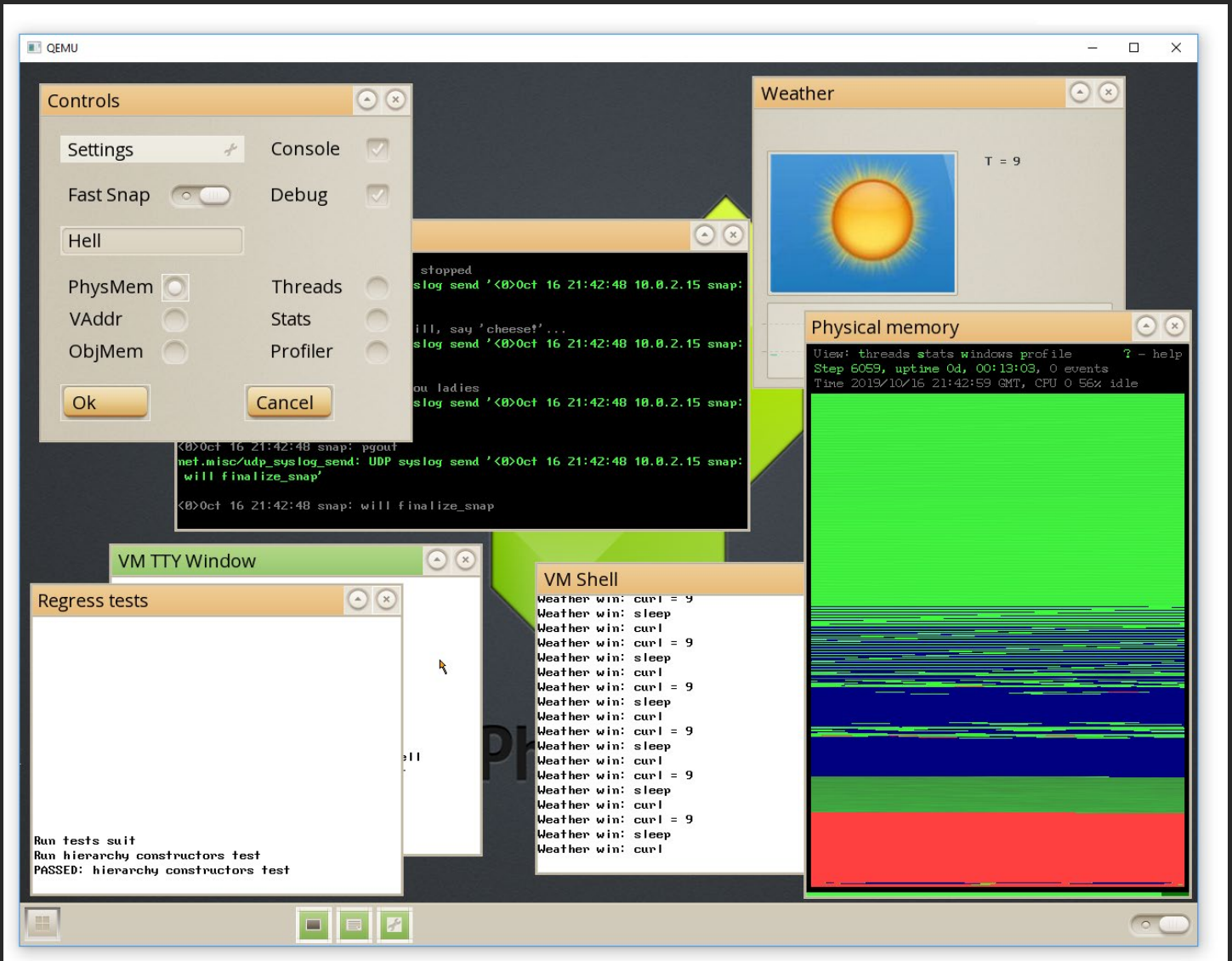

Persistence – Application code does not see OS restarts and could live forever—this makes the concept of a file obsolete and any variable or data structure could be stored forever and at the same time be available directly through a pointer. Differently from hibernation that is done in other OSs, persistence lies in the very core principles of the Phantom OS core. It is done transparently for applications; in most cases it requires no reprogramming of an application. Persistence stays even if the computer crashes.

React OS

ReactOS is a free and open-source operating system for amd64/i686 personal computers intended to be binary-compatible with computer programs and device drivers made for Windows Server 2003 and later versions of Windows. ReactOS has been noted as a potential open-source drop-in replacement for Windows and for its information on undocumented Windows APIs.

ReactOS has been in development since 1996. As of October 2020, it is still considered feature-incomplete alpha software, and is therefore recommended by the developers only for evaluation and testing purposes. However, many Windows applications are currently working, such as Adobe Reader 6.0 and LibreOffice.

ReactOS is primarily written in C, with some elements, such as ReactOS File Explorer, written in C++. The project partially implements Windows API functionality and has been ported to the AMD64 processor architecture. ReactOS, as part of the FOSS ecosystem, re-uses and collaborates with many other FOSS projects, most notably the Wine project, which presents a Windows compatibility layer for Unix-like operating systems.
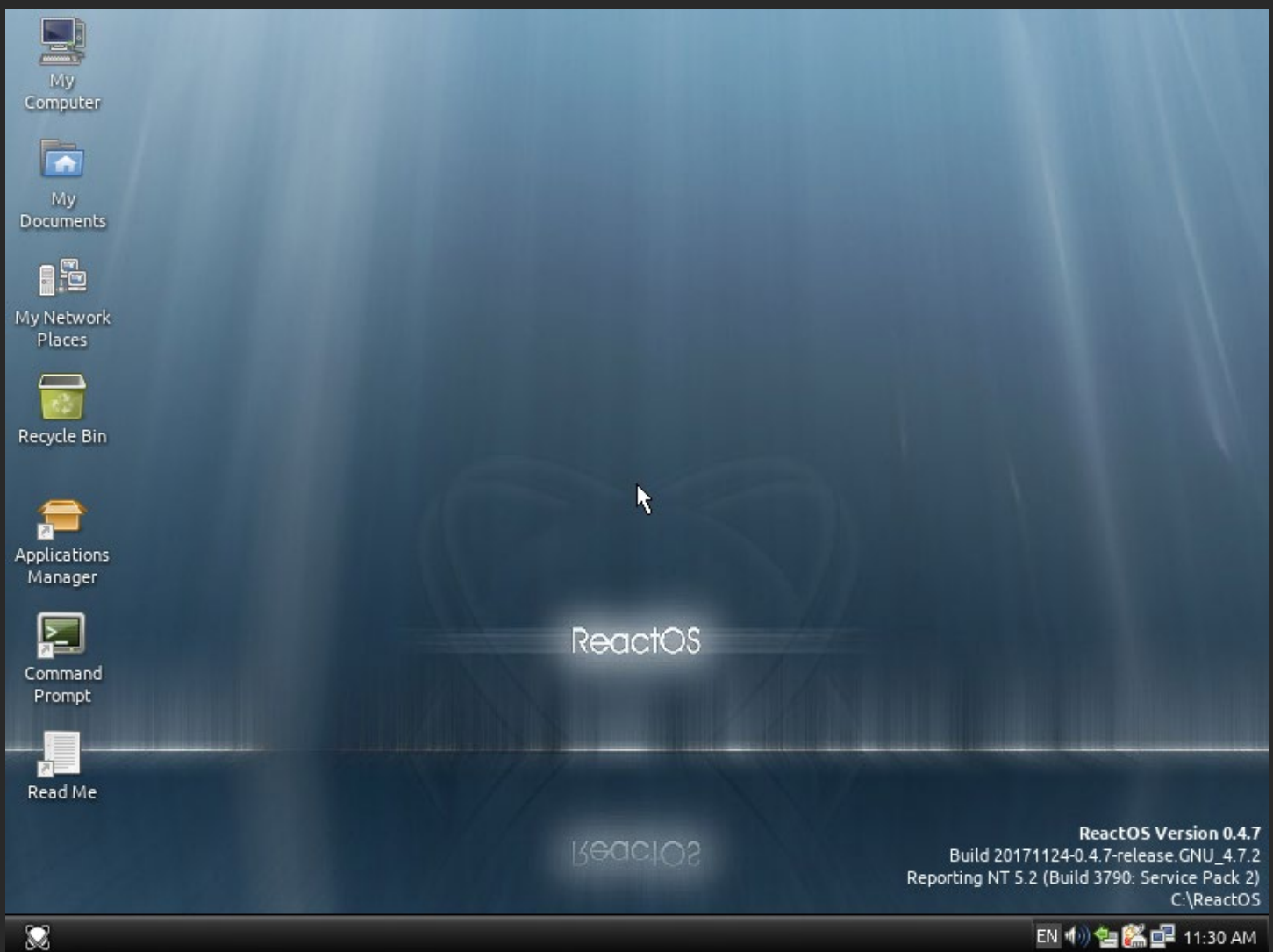
Around 1996, a group of free and open-source software developers started a project called FreeWin95 to implement a clone of Windows 95. The project stalled in discussions of the design of the system.

While FreeWin95 had started out with high expectations, there still had not been any builds released to the public by the end of 1997. As a result, the project members, led by coordinator Jason Filby, joined together to revive the project. The revived project sought to duplicate the functionality of Windows NT. In creating the new project, a new name, ReactOS, was chosen. The project began development in February 1998 by creating the basis for a new NT kernel and basic drivers. The name ReactOS was coined during an IRC chat. While the term "OS" stood for operating system, the term "react" referred to the group's dissatisfaction with – and reaction to – Microsoft's monopolistic position.

In 2002, the ReactOS Foundation was established in Moscow with Maxim Osowski and Aleksey Bragin as executive officers and Vladimir Bragin, Saveliy Tretiakov and Alexey Ivanov on the board of directors. In 2015, the foundation was liquidated.

Sharp OS

SharpOS is a discontinued computer operating system based on the .NET Framework and related programming language C#. It was developed by a group of volunteers and presided over by a team of six project administrators: Mircea-Cristian Racasan, Bruce Markham, Johann MacDonagh, Sander van Rossen, Jae Hyun, and William Lahti. It is no longer in active development, and resources have been moved to the MOSA project. As of 2017, SharpOS is one of three C#-based operating systems released under a

free and open-source software license. SharpOS has only one public version available and a basic command-line interface.

SharpOS began in November 2006 as a public discussion on the Mono development mailing list as a thread named Operating System in C#. After attracting many participants, Michael Schurter created the SharpOS.org wiki and mailing list to continue the discussion at a more relevant location. Soon after, the core developers (Bruce Markham, William Lahti, Sander van Rossen, and Mircea-Cristian Racasan) decided that they would design their own ahead-of-time (AOT) compiler to allow the operating system to run its boot sequence without using another programming language. Once the AOT compiler was far enough developed, the team then started to code the kernel. This was met with long periods of inactivity and few active developers due to lack of interest in unsafe kernel programming. On 1 January 2008, the SharpOS team made their first milestone release public, this is the first version of the software to appear in the SharpOS SourceForge package repository available for general public use.

Temple OS

TempleOS (formerly J Operating System, LoseThos, and SparrowOS) is a biblical-themed lightweight operating system (OS) designed to be the Third Temple prophesied in the Bible. It was created by United States programmer Terry A. Davis, who developed it alone over the course of a decade after a series of manic episodes that he later described as a revelation from God.

The system was characterized as a modern x86-64 Commodore 64, using an interface similar to a mixture of DOS and Turbo C. Davis proclaimed that the system's features, such as its 640x480 resolution, 16-color display, and single-voice audio, were designed according to explicit instructions from God. It was programmed with an original variation of C (named HolyC) in place of BASIC, and included an original flight simulator, compiler and kernel.

TempleOS was released as J Operating System in 2005 and as TempleOS in 2013, and was last updated in 2017.

TempleOS is a 64-bit, non-preemptive multi-tasking, multi-cored, public domain, open source, ring-0-only, single address space, non-networked, PC operating system for recreational programming. The OS runs 8-bit ASCII with graphics in source code and has a 2D and 3D graphics library, which run at 640x480 VGA with 16 colors. Like most modern operating systems, it has keyboard and mouse support. It supports ISO 9660, FAT32 and RedSea file systems (the latter created by Davis) with support for file compression. According to Davis, many of these specifications—such as the 640x480 resolution, 16-color display and single audio voice—were instructed to him by God. He explained that the limited resolution was to make it easier for children to draw illustrations for God.