Continue



```
You can't perform that action at this time. Page 2 You can't perform that action at this time. Page 3 You can't perform that action at this time. Page 3 You can't perform that action at this time. Page 3 You can't perform that action at this time. Page 3 You can't perform that action at this time. Page 3 You can't perform that action at this time.
MSYS2 Shell for Windows Automatic Releases LICENSE All upstream assets are Licensed under their respective licenses. iperf's license is included with the build assets. The iperf series of tools perform active measurements to determine the maximum achievable bandwidth on IP networks. It supports tuning of various parameters related to timing,
protocols, and buffers. For each test it reports the measured throughput, loss, and other parameters. This version, sometimes referred to as iperf3, is a redesign of an original version developed at NLANR / DAST. iperf3 is a new implementation from scratch, with the goal of a smaller, simpler code base, and a library version of the functionality that
can be used in other programs. iperf3 also incorporates a number of features found in other tools such as nuttop and netperf, but were missing from the original iperf. These include, for example, a zero-copy mode and optional JSON output. Note that iperf3 is not backwards compatible with the original iperf. Primary development for iperf3 takes
place on CentOS Linux, FreeBSD, and macOS. At this time, these are the only officially supported platforms, however there have been some reports of success with OpenBSD, Android, and other Linux distributions. iperf3 is principally developed by ESnet / Lawrence Berkeley National Laboratory. It is released under a three-clause BSD license. iperf2
is no longer being developed by its original maintainers. However, beginning in 2014, another developer began fixing bugs and enhancing functionality, and generating releases of iperf2. Both projects (as of late 2017) are currently being developed actively, but independently. More information can be found in the iperf3 FAQ. Project homepage and
documentation hosted on GitHub Pages: Project site (source code downloads: Index Module Index Search Page Share — copy and redistribute the material in any medium or format for any purpose, even commercially. Adapt — remix, transform, and build upon the material for any purpose,
even commercially. The licensor cannot revoke these freedoms as long as you follow the license terms. Attribution — You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use. ShareAlike — If you
remix, transform, or build upon the material, you must distribute your contributions under the same license as the original. No additional restrict others from doing anything the license permits. You do not have to comply with the license for elements of the material in
the public domain or where your use is permitted by an applicable exception or limitation. No warranties are given. The license may not give you all of the permissions necessary for your intended use. For example, other rights such as publicity, privacy, or moral rights may limit how you use the material. Network performance software tool This
article needs additional citations for verification. Please help improve this article by adding citations to reliable sources. "Iperf" - news · newspapers · books · scholar · JSTOR (March 2020) (Learn how and when to remove this message) iperf2Description of Iperf on TCP port 4662
under linux with an FTTH connection.Original author(s)Mark Gates, Alex WarshavskyDeveloper(s)Robert McMahon, Tim AucklandStable release 2.2.1[1] / November 6, 2024 (2024-11-06) Repositorysf.net/projects/iperf2/code/Written inCOperating systemCross-platformLicenseBSD licenseWebsitesf.net/projects/iperf2/code/Written inCOperating systemCross-platformLicenseBSD licenseBSD licen
release 3.18 / December 13, 2024 (2024-12-13) Repositorygithub.com/esnet/iperf, iperf, or iPerf, is a tool for network performance measurement and tuning. It is a cross-platform tool that can produce standardized performance measurements for any
network. iperf has client and server functionality, and can create data streams to measure the throughput between the two ends in one or both directions. [2] Typical iperf output contains a time-stamped report of the amount of data transferred and the throughput measured. The data streams can be either Transmission Control Protocol (TCP) or User
Datagram Protocol (UDP): UDP: When used for testing UDP capacity, iperf allows the user to specify the datagram throughput and the packet loss. TCP: When used for testing UDP capacity, iperf measures the throughput of the payload. iperf uses 1024 × 1024 for mebibytes and 1000 × 1000 for megabytes.
iperf is open-source software written in C, and it runs on various platforms including Linux, Unix and Windows (either natively or inside Cygwin[3]). The availability of the source code enables the user to scrutinize the measurement methodology. iperf is a compatible reimplementation of the ttcp program that was developed at the National Center for
Supercomputing Applications at the University of Illinois by the Distributed Applications Support Team (DAST) of the National Laboratory for Applied Network Research (NLANR),[4] which was shut down on December 31, 2006, on termination of funding by the United States National Science Foundation. iperf3 is a rewrite of iperf from scratch to
create a smaller, simpler code base, iperf3 is not backwards compatible with iperf2 is multi-threaded. [5] Officially iperf3 supports only Linux, or create a smaller, simpler code base, iperf3 is single threaded while iperf2 is multi-threaded. [5] Officially iperf3 supports only Linux, or create a smaller, simpler code base, iperf3 is not backwards compatible with iperf2.
Unofficial builds for Windows provided by Vivien Guéant.[6] A user of Neowin, BudMan,[7] provides unofficial Windows builds on his server.[8] Most current Linux distributions have iperf3 in their native packages are available from Oracle for Solaris 11.4. Netperf Nuttcp NetPIPE bwping Flowgrind Measuring network
throughput Packet generation model ^ "Iperf 2 - Browse Files". SourceForge.net. ^ "IPerf - The TCP, UDP and SCTP network bandwidth measurement tool". 2005. Archived from the original on 2008-10-12. ^ "iperf3 FAQ".
2018-07-02. ^ "iPerf - The TCP, UDP and SCTP network bandwidth measurement tool". iperf.fr. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 2025-02-04. ^ "Iperf 3.18 Windows build". Neowin. 2014-10-28. Retrieved 
Performance". Schroder, Carla (2007-01-31). "Measure Network Performance with iperf". Retrieved from " How To Use VLC Media Player to Trim Video Clips What Is the $WinREAgent Folder and Can I Delete It? Swear Your Way to Better Search Results How to Get a Dark Start Menu and Taskbar in Windows 10 & 11 Enable, Disable, Manage
Delete or Create a System Restore Point PowerShell and Command Prompt 101 Install All the Microsoft C++ Runtimes at Once with Visual C++ Runtimes at Once with Visual
available at: macOS: HomeBrew: brew install iperf3 MacPorts: sudo port install iperf3 Fedora / Red Hat / CentOS / Rocky launch a terminal and type yum install iperf3 FreeBSD launch a terminal and type sudo pkg install
benchmarks/iperf3 French forum for iPerf iPerf3 server log script: iperf3tocsv.py (2.5 KiB) by Kirth Gersen Log for iPerf3: display "date,ip,localport,remoteport,duration,protocol,num_streams,cookie,sent,sent_mbps,rcvd,rcvd_mbps,totalsent,totalreceived" Removing the old version: sudo apt remove iperf3 libiperf0 Install the dependency: sudo apt
install libsctp1 Take a recent Ubuntu distribution from source/iperf3 3.xx-1 amd64.deb packages (use amd64.deb packages (use amd64.deb packages that are now
unnecessary: rm libiperf0 3.xx-1 amd64.deb iperf3 3.xx
used for its namesake, the Berkeley Software Distribution (BSD), a Unix-like operating system. The original version has since been revised, and its descendants are referred to as modified BSD licenses. BSD is both a license and a class of license (generally referred to as BSD-like). The modified BSD license (in wide use today) is very similar to the
license originally used for the BSD license e.g. GPL) does not require that merely requires that all code retain the BSD license (unlike some other licenses e.g. GPL) does not require that source code be distributed
at all. In addition to the original (4-clause) license used for BSD, several derivative licenses have emerged that are also commonly referred to as a "BSD license is the year of the copyright. As published in BSD, is the year of the copyright. As published in BSD, is the year of the copyright.
"Regents of the University of California". Prior BSD LicenseAuthorRegents of the University of CaliforniaPublisherPublic domainPublished1988SPDX identifierBSD-4.3TAHOEDebian FSG compatibleYesOSI approvedNoGPL compatibleNoCopyleftNoLinking from code with a different licenceYes Some releases of BSD prior to the adoption of the 4-
clause BSD license used a license used a license that is clearly ancestral to the 4-clause BSD license. These releases include some parts of 4.3BSD-Reno, Net/2, and 4.4BSD-Alpha. Copyright (c). All rights reserved.
Redistribution and use in source and binary forms are permitted provided that the above copyright notice and this paragraph are duplicated in all such forms and that any documentation, advertising materials, and other materials related to such distribution and use acknowledge that the software was developed by the . The name of the may not be
used to endorse or promote products derived from this software without specific prior written permission. THIS SOFTWARE IS PROVIDED 'AS IS" AND WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.
BSD LicenseAuthorRegents of the University of California Publisher Public domain Published 1990SPDX identifier BSD-4-Clause (see list for more[2]) Debian FSG compatible Yes[3]FSF approved Yes[4]OSI appro
in later licenses, known as the "advertising clause". This clause eventually became controversial, as it required authors of all works deriving from a BSD-licensed work to include an acknowledgment of the original source in all advertising material. This was clause number 3 in the original license text:[6] Copyright (c), All rights reserved.
Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met: Redistributions in binary form must reproduce the above copyright notice, this list of
conditions and the following disclaimer in the documentation and/or other materials provided with the distribution. All advertising materials mentioning features or use of this software must display the following acknowledgement: This product includes software developed by the . Neither the name of the nor the names of its contributors may be used
to endorse or promote products derived from this software without specific prior written permission. THIS SOFTWARE IS PROVIDED BY AS IS AND ANY EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE
DISCLAIMED. IN NO EVENT SHALL BE LIABLE FOR ANY DIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND
ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.[6] This clause was objected to on the grounds that as people changed the license to
reflect their name or organization it led to escalating advertising requirements when programs were combined in a software distribution: every occurrence of the license with a different name required a separate acknowledgment. In arguing against it, Richard Stallman has stated that he counted 75 such acknowledgments in a 1997 version of
NetBSD.[7] In addition, the clause presented a legal problem for those wishing to publish BSD-licensed software which relies upon separate programs using the GNU GPL: the advertising clause is incompatible with the GPL, which does not allow the addition of restrictions beyond those it already imposes; because of this, the GPL's publisher, the Free
Software Foundation, recommends developers not use the license, though it states there is no reason not to use software already using it.[4] See also: University of California Published 22 July 1999[6] SPDX identifier BSD-3-Clause (see list for
more[2])Debian FSG compatibleYes[3]FSF approvedYes[8]OSI approvedYes[8]CopyleftNo[8]Linking from code with a different license text in the official BSD license on July 22, 1999, by William Hoskins, Director of the Office of Technology Licensing for UC Berkeley.[6][9]
[10] On January 31, 2012, UC Berkeley Executive Director of the Office of Intellectual Property and Industry Alliances established that licensees and distributors are no longer required to include the acknowledgement within advertising materials. Accordingly, the advertising clause 3 of the original 4-clause BSD license for any and all software
officially licensed under a UC Berkeley version of the BSD license, was deleted in its entirety.[11] Other BSD distributions removed the clause, but many similar clauses remain in BSD-derived code from other sources, and unrelated code using a derived license. While the original license is sometimes referred to as the "BSD-old", the resulting 3-clause
version is sometimes referred to by "BSD-new." Other names include new BSD, "revised BSD", "BSD-3", or "3-clause BSD". This version has been vetted as an Open source license by the OSI as "The BSD License". [5] The Free Software Foundation, which refers to the license as the "Modified BSD License", states that it is compatible with the GNU
GPL. The FSF encourages users to be specific when referring to it as "a BSD license by name (i.e. not simply referring to it as "a BSD license by name (i.e. not simply referring to it as "a BSD license" or "BSD-style") to avoid confusion with the original BSD license by name (i.e. not simply referring to it as "a BSD license by name (i.e. not simply referring to it as "a BSD license by name (i.e. not simply referring to it as "a BSD license" or "BSD-style") to avoid confusion with the original BSD license by name (i.e. not simply referring to it as "a BSD license" or "BSD-style") to avoid confusion with the original BSD license by name (i.e. not simply referring to it as "a BSD license" or "BSD-style") to avoid confusion with the original BSD license by name (i.e. not simply referring to it as "a BSD license" or "BSD-style") to avoid confusion with the original BSD license by name (i.e. not simply referring to it as "a BSD license" or "BSD-style") to avoid confusion with the original BSD license by name (i.e. not simply referring to it as "a BSD license" or "BSD-style") to avoid confusion with the original BSD license by name (i.e. not simply referring to it as "a BSD license" or "BSD-style") to avoid confusion with the original BSD license by name (i.e. not simply referring to it as "a BSD license" or "BSD-style") to avoid confusion with the original BSD license by name (i.e. not simply referring to it as "a BSD license" or "BSD-style") to avoid confusion with the original BSD license by name (i.e. not simply referring to it as "a BSD license" or "BSD-style") to avoid confusion with the original BSD license by name (i.e. not simply referring to it as "a BSD license" or "BSD-style") to avoid confusion with the original BSD license by name (i.e. not simply referring to it as "a BSD license" or "BSD-style") to avoid confusion with the original BSD license by name (i.e. not simply referring to it as "a BSD license" or "BSD-style") to avoid confusion with the original BSD license by name (i.e. not simply referring 
The license also contains a clause restricting use of the names of contributors for endorsement of a derived work without modification, are permitted provided that the following conditions are met: Redistributions of source code must retain the above
copyright notice, this list of conditions and the following disclaimer. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution. Neither the name of the copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
used to endorse or promote products derived from this software without specific prior written permission. THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND
and/or other materials provided with the distribution. THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE
NetBSD, use a similar 2-clause license. [16] This version has been vetted as an Open source license by the OSI as the "Simplified BSD License." [5] The ISC license without the 'and/or' wording is functionally equivalent, and endorsed by the OpenBSD project as a license template for new contributions. [17] BSD Zero Clause License AuthorRob
LandleyPublished2013SPDX identifier0BSDDebian FSG compatibleYes[18]COpyleftNoLinking from code with a different licenceYes The BSD 0-clause license goes further than the 2-clause license by dropping the requirements to include the copyright notice, license text, or disclaimer in
either source or binary forms. Doing so forms a public-domain-equivalent license, [20] the same way as MIT No Attribution License 1.0.0". [21][22] It was created by Rob Landley and first used in Toybox when he was disappointed after using the GNU General Public
License in BusyBox.[23] Copyright (C) [year] by [copyright holder] Permission to use, copy, modify, and/or distribute this software for any purpose with or without fee is hereby granted. THE SOFTWARE INCLUDING ALL IMPLIED
TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.[22] The SPDX License with only the source code retaining clause, used by Berkeley Software Design in the 1990s,[24][25] and later used by
the Boost Software License. OSI approved since 2020. [26] BSD-2-Clause-No-Nuclear-Warranty, a variation of BSD-2-Clause with a patent grant. OSI approved since 2017. [27] BSD-3-Clause-No-Nuclear-Warranty, a variation of BSD-3-Clause with a patent grant.
project argues on the advantages of BSD-style licenses for companies and general flexibility, stating that the BSD-style licenses place only "minimal restrictions on future behavior" and are not "legal time-bombs", unlike copyleft licenses for companies and general flexibility, stating that the BSD-style licenses and general flexibility, stating that the BSD-style licenses and general flexibility, stating that the BSD-style licenses for companies and general flexibility, stating that the BSD-style licenses for companies and general flexibility with proprietary licenses flexibility with proprietary licen
proprietary use and allows the software released under the license to be incorporated into proprietary products. Works based on the material may be released under them. The 3-clause BSD license, like most permissive licenses, is compatible with almost all
 FOSS licenses (and as well proprietary licenses).[29][30] Two variants of the license, the New BSD License/Modified BSD License (3-clause),[8] and the Simplified BSD License (3-clause),[8] and the Simplified BSD License (3-clause),[8] and the Simplified BSD License (3-clause), [8] and the Simplified BSD Li
the Open Source Initiative.[5] The original, 4-clause BSD license has not been accepted as an open source license by the FSF, the FSF does not consider it to be compatible with the GPL due to the advertising clause.[4] Over the years I've become convinced that the BSD license is
great for code you don't care about. I'll use it myself. If there's a library routine that I just want to say 'hey, this is useful to anybody and I'm not going to maintain this,' I'll put it under the BSD license families in the free and open-source
software ecosystem, and has been the inspiration for a number of other licenses. Many FOSS software projects use a BSD license, for instance the BSD OS family (FreeBSD etc.), Google's Bionic or Toybox. As of 2015[update] the BSD 3-clause license ranked in popularity number five according to Black Duck Software[32] and sixth according to
GitHub data.[33] Free and open-source software portal Comparison of free and open-source software licenses Software using the BSD license (category) Sostic, Keith (15 June 1988). "4.3BSD-tahoe release". Newsgroup: comp.sys.tahoe. Retrieved 5 December 2021. a b c d "SPDX License List". spdx.org. SPDX Working Group. a b "License List". spdx.org. SPDX Working Group. SPDX Working Group. a b "License List". spdx.org. SPDX Working Group. SPDX Worki
information". Debian. Retrieved 18 February 2010. ^ a b c d e "Original BSD license". Various Licenses and Comments about Them. Free Software Foundation. Retrieved 2 October 2006. Archived from the original on 29 November 2009. Retrieved 6 December 2009.
 ^ a b c d "To All Licensees, Distributors of Any Version of BSD". University of California, Berkeley. 22 July 1999. Retrieved 15 November 2006. A c d e f "Modified BSD license". Various
Licenses and Comments about Them. Free Software Foundation. Retrieved 2 October 2010. ^ "Berkeley removes Advertising Clause - Slashdot". bsd.slashdot.org. 2 September 1999. Retrieved 2 October 2010. ^ "Berkeley removes Advertising Clause - Slashdot". bsd.slashdot.org. 2 September 1999. Retrieved 2 October 2010. ^ "Berkeley removes Advertising Clause - Slashdot". bsd.slashdot.org. 2 September 1999. Retrieved 2 October 2010. ^ "Berkeley removes Advertising Clause - Slashdot". bsd.slashdot.org. 2 September 1999. Retrieved 2 September 2021. ^ "Berkeley removes Advertising Clause - Slashdot". bsd.slashdot.org. 2 September 1999. Retrieved 2 September 2021. ^ "Berkeley removes Advertising Clause - Slashdot". bsd.slashdot.org. 2 September 1999. Retrieved 2 September 2021. ^ "Berkeley removes Advertising Clause - Slashdot". bsd.slashdot.org. 2 September 2021. ^ "Berkeley removes Advertising Clause - Slashdot". bsd.slashdot.org. 2 September 2021. ^ "Berkeley removes Advertising Clause - Slashdot". bsd.slashdot.org. 2 September 2021. ^ "Berkeley removes Advertising Clause - Slashdot". bsd.slashdot.org. 2 September 2021. ^ "Berkeley removes Advertising Clause - Slashdot". bsd.slashdot.org. 2 September 2021. ^ "Berkeley removes Advertising Clause - Slashdot". bsd.slashdot.org. 2 September 2021. ^ "Berkeley removes Advertising Clause - Slashdot". bsd.slashdot.org. 2 September 2021. ^ "Berkeley removes Advertising Clause - Slashdot". bsd.slashdot.org. 2 September 2021. ^ "Berkeley removes Advertising Clause - Slashdot". bsd.slashdot.org. 2 September 2021. ^ "Berkeley removes Advertising Clause - Slashdot". bsd.slashdot.org. 2 September 2021. ^ "Berkeley removes Advertising Clause - Slashdot". bsd.slashdot.org. 2 September 2021. ^ "Berkeley removes Advertising Clause - Slashdot". bsd.slashdot.org. 2 September 2021. ^ "Berkeley removes Advertising Clause - Slashdot". bsd.slashdot - Slashdot - Slas
Michael. "Executive Director, Office of Intellectual Property and Industry Research Alliances, University of California, Berkeley. (PDF). Office of Intellectual Property and Industry Research Alliances, University of California, Berkeley. (PDF).
Free Software Foundation. Retrieved 2 October 2010. ^ a b "The FreeBSD Copyright". The FreeBSD Copyright (as available at archive.org)". The FreeBSD Foundation. Archived from the original on 29 April 1999. Retrieved 7 January 2017. {{cite
web}}: CS1 maint: bot: original URL status unknown (link) ^ "The FreeBSD Copyright". freebsd.org. Retrieved 6 December 2009. ^ "OpenBSD Copyright Policy". Retrieved 17 July 2016. ^ a b "Zero-clause license". Various Licenses and Comments about
Them. Free Software Foundation. Retrieved 2 October 2010. ^ "[License-review] Please rename "Free Public License-1.0.0" to 0BSD". Retrieved 15 February 2019. ^ "BSD Zero Clause License". spdx.org. Retrieved 19 February 2021. ^ a b "Zero Clause License".
Clause BSD / Free Public License 1.0.0 (0BSD)". opensource.org. 5 December 2015. Retrieved 19 February 2021. Toybox vs BusyBox - Rob Landley, hobbyist, retrieved 30 May 2022. "Log of /head/include/ifaddrs.h". svnweb.freebsd.org. Retrieved 28 April 2023 Retrieved 28 April 2023.
30 May 2022. ^ "1-clause BSD License - Open Source Initiative". Open Source Initiative. 4 April 2017. Retrieved 26 March 2024. ^ "BSD+Patent - Open Source Initiative". Open Source Initiative. 4 April 2017. Retrieved 26 March 2024. ^ "BSD+Patent - Open Source Initiative".
- GPL Advantages and Disadvantages". FreeBSD. Retrieved 28 November 2015. In contrast to the GPL, which is designed to prevent the proprietary commercialization of Open Source or become integrated into commercial solutions, as
a project's or company's needs change. In other words, the BSD license does not become a legal time-bomb at any point in the development process. In addition, since the BSD license does not come with the legal complexity of the GPL or LGPL licenses, it allows developers and companies to spend their time creating and promoting good code rather
than worrying if that code violates licensing. ^ Hanwell, Marcus D. (28 January 2014). "Should I use a permissive licenses is in the
simplicity of reuse. The license usually only pertains to the source code that is licensed and makes no attempt to infer any conditions upon any other component, and because of this there is no need to define what constitutes a derived work. I have also never seen a license compatibility chart for permissive licenses; it seems that they are all
compatible. ^ "Licence Compatibility and Interoperability". Open-Source Software - Develop, share, and reuse open source software for public administrations. joinup.ec.europa.eu. Archived from the original on 17 June 2015. Retrieved 30 May 2015. The licences for distributing free or open source software (FOSS) are divided in two families:
permissive and copyleft. Permissive licences (BSD, MIT, X11, Apache, Zope) are generally compatible and interoperable with most other licences (including non-free or "proprietary"). ^ Torvalds at LinuxCon Part III: Permissive Licenses and Organization of the covered code and to re-distribute it under many licences (including non-free or "proprietary"). ^ Torvalds at LinuxCon Part III: Permissive Licenses and Organization of the covered code and to re-distribute it under many licences (including non-free or "proprietary"). ^ Torvalds at LinuxCon Part III: Permissive Licenses and Organization of the covered code and to re-distribute it under many licences (including non-free or "proprietary"). ^ Torvalds at LinuxCon Part III: Permissive Licenses and Organization of the covered code and to re-distribute it under many licenses (including non-free or "proprietary"). ^ Torvalds at LinuxCon Part III: Permissive Licenses and Organization of the covered code and to re-distribute it under many licenses (including non-free or "proprietary"). ^ Torvalds at LinuxCon Part III: Permissive Licenses and Organization of the covered code and th
Charts FOSS Force, 2016 ^ "Top 20 licenses". Black Duck Software. 19 November 2015. Archived from the original on 19 July 2016. Retrieved 19 November 2015. 1. MIT license (GPL) 3.0 9%, 5. BSD License 2.0 (3-clause, New or Revised)
License 6%, 6. GNU Lesser General Public License (LGPL) 2.1 5%, 7. Artistic License (Perl) 4%, 8. GNU Lesser General Public License (LGPL) 3.0 2%, 9. Microsoft Public License usage on GitHub.com. Retrieved 21 November 2015. "1 MIT
44.69%, 2 Other 15.68%, 3 GPLv2 12.96%, 4 Apache 11.19%, 5 GPLv3 8.88%, 6 BSD 3-clause 4.53%, 7 Unlicense 1.87%, 8 BSD 2-clause 1.70%, 9 LGPLv3 1.30%, 10 AGPLv3 1.30%, 10 AGPLv
O'Reilly 1999 The Amazing Disappearing BSD License BSD
"Multi-platform" redirects here. For the mode of storytelling in television, see multi-platform television. Within computing, cross-platform software (also called multi-platform software, platform-agnostic software, or platform television. Within computing platform software, or platform television. Within computing platform software, or platform software (also called multi-platform software) is computer software (also called multi-platform software, or platform software) is computer software (also called multi-platform software) is computer software (also called mu
software requires a separate build for each platform, but some can be directly run on any platform without special preparation, being written in an interpreter or run-time packages are common or standard components of all supported platforms.[2] For example, a cross-platform
application may run on Linux, macOS and Microsoft Windows. Cross-platform software may run on many platforms, or as few as two. Some frameworks for cross-platform development are Codename One, ArkUI-X, Kivy, Qt, GTK, Flutter, NativeScript, Xamarin, Apache Cordova, Ionic, and React Native.[3] Main article: Computing platform Platform Platform NativeScript, Xamarin, Apache Cordova, Ionic, and React Native.[3] Main article: Computing platform Platform NativeScript, Xamarin, Apache Cordova, Ionic, and React Native.[3] Main article: Computing platform Platform NativeScript, Xamarin, Apache Cordova, Ionic, and React NativeScript, Apache Cordova, Ionic, and React NativeScript, Apache Cordova, Ionic, and React NativeScript, Apache Cordova, Ionic, and Ionic, a
can refer to the type of processor (CPU) or other hardware on which an operating system (OS) or a combination of the two.[4] An example of a common platform is Android which runs on the ARM architecture family. Other well-known platforms are Linux/Unix, macOS and Windows, these are all cross-platform.[4]
Applications can be written to depend on the features of a particular platform which runs on many OSs and hardware types. A hardware platform can refer to an instruction set architecture. For example: ARM or the x86
architecture. These machines can run different operating systems. Smartphones and tablets generally run ARM architecture, these often run Android or iOS and other mobile operating systems. A software platform can be either an operating system (OS) or programming environment, though more commonly it is a combination of both. An exception
Java, which uses an OS-independent virtual machine (VM) to execute Java bytecode. Some software platforms are: Android (ARM64) ChromeOS (ARM32, ARM64, IA-32, x86-64) Common Language Infrastructure (CLI) by Microsoft, implemented in: The legacy .NET Framework that works only on Microsoft Windows. The newer .NET framework
(simply called ".NET") that works across Microsoft Windows, macOS, and Linux. Other implementations such as Mono (formerly by Novell and Xamarin[5]) HarmonyOS (ARM64, RISC-V, x86, x64, and LoongArch, iOS ((ARMv8-A)) iPadOS (ARMv8-A) java Linux (Alpha, ARC, ARM, C-Sky, Hexagon, LoongArch, m68k, Microblaze, MIPS, Nios II,
OpenRISC, PA-RISC, PowerPC, RISC-V, s390, SuperH, SPARC, x86, ARM (Apple silicon) Microsoft Windows (IA-32, x86-64, ARM, ARM64) PlayStation 3 (PowerPC) and PlayStation Vita (ARM) Solaris (SPARC, x86) SPARC Unix (many platforms since 1969) Web browsers - mostly compatible with each other
running JavaScript web-apps Xbox Minor, historical AmigaOS (m68k), AmigaOS (m68k), AmigaOS (m68k), AmigaOS (powerPC), AROS (x86, PowerPC), AROS (x86, PowerP
article: Java (software platform) The Java language is typically compiled to run on a VM that is part of the Java virtual machine (Java vM, JVM) is a CPU implement a JVM. Java software can be executed by a hardware-based Java
processor. This is used mostly in embedded systems. Java code running in the JVM has access to OS-related services, like disk input/output (I/O) and network access, if the appropriate privileges are granted. The JVM makes the system calls on behalf of the Java application. This lets users to decide the appropriate privileges are granted. The JVM makes the system calls on behalf of the Java application. This lets users to decide the appropriate privileges are granted.
access-control list (ACL). For example, disk and network access is usually enabled for desktop applications, but not for browser-based applets. The Java Native Interface (JNI) can also be used to access OS-specific functions, with a loss of portability. Currently, Java Standard Edition software can run on Microsoft Windows, macOS, several Unix-like
OSs, and several real-time operating systems for embedded devices. For mobile applications, browser plugins are used for Windows and Mac based devices. For software to be
considered cross-platform, it must function on more than one computer architecture or OS. Developing such software written for one OS may not automatically work on all architectures that OS supports. Just because software is
written in a popular programming language such as C or C++, it does not mean it will run on all OSs that support that language—or even on different versions of the same OS. Web applications are typically described as cross-platform because, ideally, they are accessible from any web browser: the browser is the platform. Web applications generally
employ a client-server model, but vary widely in complexity and functionality. It can be hard to reconcile the desire for features with the need for compatibility. Basic web application consists of simple
exchanges of data requests and server responses. This type of application was the norm in the early phases of World Wide Web application development. Such application development. Such application was the norm in the early phases of World Wide Web application development.
are deemed more critical than advanced functionality. Prominent examples of advanced web applications include the Web interface to Gmail and Google Maps. Such applications routinely depend on additional features found only in the more recent versions of popular web browsers. These features include Ajax, JavaScript, Dynamic HTML, SVG, and
other components of rich web applications. Because of the competing interests of compatibility and functionality, numerous design strategies have emerged. Many software systems use a layered architecture where platform-dependent code is restricted to the upper- and lowermost layers. Graceful degradation attempts to provide the same or similar
functionality to all users and platforms, while diminishing that functionality to a least common denominator for more limited client browsers. For example, a user attempting to use a limited-feature browser to access Gmail may notice that Gmail switches to basic mode, with reduced functionality but still of use. Some software is maintained in distinct
codebases for different (hardware and OS) platforms, with equivalent functionality. This strategy relies on having one codebase that may be compiled to multiple platform-specific formats. One technique is conditional compilation
With this technique, code that is common to all platforms is not repeated. Blocks of code that are only relevant to certain platforms are made conditional, so that they are only interpreted or compiled when needed. Another technique is separation of functionality, which disables functionality not supported by browsers or OSs, while still delivering a
complete application to the user. (See also: Separation of concerns.) This technique is used in web development where interpreted code (as in scripting languages) can query the platform it is running on to execute different blocks conditionally.[6] Third-party libraries attempt to simplify cross-platform capability by hiding the complexities of client
differentiation behind a single, unified API, at the expense of vendor lock-in. Responsive web design (RWD) is a Web design approach aimed at crafting the visual layout of sites to provide an optimal viewing experience—easy reading and navigation with a minimum of resizing, panning, and scrolling—across a wide range of devices, from mobile
phones to desktop computer monitors. Little or no platform-specific code is used with this technique. Cross-platform applications need much more integration testing. Some web browsers prohibit installation of different versions on the same machine. There are several approaches used to target multiple platforms, but all of them result in software
that requires substantial manual effort for testing and maintenance.[7] Techniques such as full virtualization are sometimes used as a workaround for this problem. Tools such as the Page Object Model allow cross-platform tests to be scripted so that one test case covers multiple versions of an app. If different versions have similar user interfaces, all
can be tested with one test case. Web applications are becoming increasingly popular but many computer users still use traditional application software which does not rely on a client/web-server architecture. The distinction between traditional applications is not always clear. Features, installation methods and architectures for web and
traditional applications overlap and blur the distinction. Nevertheless, this simplifying distinction is a common and useful generalization. Traditional application software has been distributed as binary files, especially executable could
be very bloated with code that never executes on a particular platform. Instead, generally there is a selection of executable, each built for one platform, using a toolset that translates—transcompiles—a single
codebase into multiple binary executables. For example, Firefox, an open-source web browser, is available on Windows, macOS (both PowerPC and x86 through what Apple Inc. calls a Universal binary), Linux, and BSD) are separate executable
distributions, although they come largely from the same source code. In rare cases, executable code built for several platforms is combined into a single executable file called a fat binary. The use of different toolsets may not be enough to build a working executable for different platforms. In this case, programmers must port the source code to the
new platform. For example, an application such as Firefox, which already runs on Windows on the x86 family, can be modified and re-built to run on Linux on the x86 (and potentially other architectures) as well. The multiple versions of the code may be stored as separate codebases, or merged into one codebase. An alternative to porting is cross-
platform virtualization, where applications compiled for one platform can run on another without modifications compiled for the previous generation of Macs that used PowerPC CPUs. Another example is IBM PowerVM runs applications compiled for the previous generation of Macs that used PowerPC CPUs. Another example is IBM PowerVM runs applications compiled for the previous generation of the source code or binaries.
Lx86, which allows Linux/x86 applications to run unmodified on the Linux/Power OS. Example of cross-platform binary software: The LibreOffice office suite is built for Microsoft Windows, macOS, Linux, FreeBSD, OpenBSD, Android, iOS, iPadOS, ChromeOS, web-based Collabora Online and many others.[8][9] Many of these are supported
on several hardware platforms with processor architectures including IA-32, x86-64, ARM (ARMel, ARMhf, ARM64), MIPS, MIPSel, PowerPC, ppc64le, and S390x[9][10] A script can be considered to be cross-platform if its interpreter is available on multiple platforms and the script only uses the facilities built into the language. For example, a script
written in Python for a Unix-like system will likely run with little or no modification on Windows, because Python also runs on Windows; indeed there are many implementations (e.g. IronPython for .NET Framework). The same goes for many of the open-source scripting languages. Unlike binary executable files, the same script can be used on all
computers that have software to interpret the script. This is because the script is generally stored in plain text in a text file. There may be some trivial issues, such as the representation of a new line character. Some popular cross-platform scripting languages are: bash - A Unix shell commonly run on Linux and other modern Unix-like systems, as well
as on Windows via the Cygwin POSIX compatibility layer, Git for Windows, or the Windows, or the Windows Subsystem for Linux. Perl - First released in 1987. Used for web applications. Python - A language which focuses on rapid application development and ease of writing
 instead of run-time efficiency. Ruby - An object-oriented language which aims to be easy to read. Can also be used on the web through Ruby on Rails. Tcl - A dynamic programming language, suitable for a wide range of uses, including web and desktop applications, networking, administration, testing and many more. Cross-platform or multi
is a term that can also apply to video games released on a range of video game consoles. Examples of cross-platform games include: Miner 2049er, Tomb Raider: Legend, FIFA series, NHL series and Minecraft. Each has been released across a variety of gaming platforms, such as the Wii, PlayStation 3, Xbox 360, personal computers, and mobile
devices. Some platforms are harder to write for than others, requiring more time to develop the video game may be released on a few platforms first, then later on others. Typically, this happens when a new gaming system is released, because video game developers need to acquaint themselves with
its hardware and software. Some games may not be cross-platform because of licensing agreements between development to one particular console. As an example, Disney could create a game with the intention of release on the latest Nintendo and Sony game consoles. Should Disney
license the game with Sony first, it may be required to release the game solely on Sony's console for a short time or indefinitely. Main articles: Cross-platform play and List of video games that support cross-platform play Several developers have implemented ways to play games online while using different platforms. Psyonix, Epic Games, Microsoft,
and Valve all possess technology that allows Xbox 360 and PlayStation 3 gamers to play with PC gamers, leaving the decision of which platform to use to consumers. The first game to allow this level of interactivity between PC and console games (Dreamcast with specially produced keyboard and mouse) was Quake 3.[11][12] Games that feature cross-
platform online play include Rocket League, Final Fantasy XIV, Street Fighter V, Killer Instinct, Paragon and Fable Fortune, and Minecraft with its Better Together update on Windows 10, VR editions, Pocket Edition and Xbox One. Cross-platform programming is the practice of deliberately writing software to work on more than one platform. There
are different ways to write a cross-platform application. One approach is to create multiple versions of the same software in different source trees—in other words, the Microsoft Windows version another, while a FOSS *nix system might have a third. While this is
straightforward, compared to developing for only one platform it can cost much more to pay a larger team or release products more slowly. It can also result in more bugs to be tracked and fixed. Another approach is to use software that hides the differences between the platforms. This abstraction layer insulates the application from the platform.
Such applications are platform agnostic. Applications that run on the JVM are built this way. Some applications mix various methods of cross-platform programming to create the final application. An example is the Firefox web browser, which uses abstraction to build some of the lower-level components, with separate source subtrees for
implementing platform-specific features (like the GUI), and the implementation of more than one scripting language to ease software portability. Firefox implements XUL, CSS and JavaScript for extending the browser, in addition to classic Netscape-style browser plugins. Much of the browser itself is written in XUL, CSS, and JavaScript. There are
many tools 13 14 available to help the process of cross-platform that works in all Indian languages, including their keyboards, and also
supports AppWallet and native performance in all OSs. AppearIQ: a framework that supports the workflow of app development and deployment in an enterprise environment. Natively development of mobile apps that
run on different platforms. Boden: a UI framework written in C++. Cairo: a free software library used to provide a vector graphics-based, device-independent API. It is designed to provide primitives for 2-dimensional drawing across a number of different backends. Cairo is written in C and has bindings for many programming languages. Cocos2d: an
open-source toolkit and game engine for developing 2D and simple 3D cross-platform games and applications. Codename One: an open-source Write Once Run Anywhere (WORA) framework for Java and Kotlin developers. Delphi: an IDE which uses a Pascal-based language for development. It supports Android, iOS, Windows, macOS, Linux. Ecere
SDK: a GUI and 2D/3D graphics toolkit and IDE, written in eC and with support for additional languages such as C and Python. It supports Linux, FreeBSD, Windows, Android, macOS and the Web through Emscripten or Binaryen [Wikidata] (WebAssembly).
architecture which supports many tools for software development. Add-ons are available for several languages, including Java and C++. FLTK: an open-source toolkit, but more lightweight because it restricts itself to the GUI. Flutter: A cross-platform UI framework for IOS, Android, Mac, Windows and developed by Google. fpGUI: An open-source
widget toolkit that is completely implemented in Object Pascal. It currently supports Linux, Windows and a bit of Windows CE. GeneXus: A Windows rapid software development solution for cross-platform application creation and deployment based on knowledge representation and supporting C#, COBOL, Java including Android and BlackBerry smart
devices, Objective-C for Apple mobile devices, RPG, Ruby, Visual Basic, and Visual FoxPro. GLBasic: A BASIC dialect and compilers for many platforms and supports numerous platform (Windows, Mac, Linux, Android, iOS and some exotic handhelds). Godot: an SDK which uses Godot Engine. GTK+:
An open-source widget toolkit for Unix-like systems with X11 and Microsoft Windows, POSIX, macOS), with no change to the code. Kivy: an open-source cross-platform UI framework written in C++, used to write native software on numerous systems (Microsoft Windows, POSIX, macOS), with no change to the code. Kivy: an open-source cross-platform UI framework written in C++, used to write native software on numerous systems (Microsoft Windows, POSIX, macOS), with no change to the code. Kivy: an open-source cross-platform UI framework written in C++, used to write native software on numerous systems (Microsoft Windows, POSIX, macOS), with no change to the code. Kivy: an open-source cross-platform UI framework written in C++, used to write native software on numerous systems (Microsoft Windows, POSIX, macOS), with no change to the code. Kivy: an open-source cross-platform UI framework written in C++, used to write native software on numerous systems (Microsoft Windows, POSIX, macOS), with no change to the code. Kivy: an open-source cross-platform UI framework written in C++, used to write native software on numerous systems (Microsoft Windows, POSIX, macOS), with no change to the code. Kivy: an open-source cross-platform UI framework written in C++, used to write native software on numerous systems (Microsoft Windows, POSIX) and the code is the code 
Python, It supports Android, iOS, Linux, OS X, Windows and Raspberry Pi. LEADTOOLS: Cross-platform SDK libraries to integrate recognition, document, medical, imaging, and multimedia technologies into Windows, iOS, macOS, Android, Linux and web applications, [15] LiveCode: a commercial cross-platform rapid application development language
inspired by HyperTalk. Lazarus: A programming environment for the FreePascal Compiler. It supports the creation of self-standing graphical and console applications and runs on Linux, MacOSX, iOS, Android, WinCE, Windows and WEB. Max/MSP: A visual programming language that encapsulates platform-independent code with a platform-specific
runtime environment into applications for macOS and Windows A cross-platform Android apps to run natively on iOS and macOS Mendix: a cloud-based low-code application development platform. MonoCross: an open-source model-view-controller design pattern where the model and controller are cross-
platform but the view is platform-specific.[16] Mono: An open-source cross-platform version of Microsoft .NET (a framework for application framework and programming languages) MoSync: an open-source platform version of Microsoft .NET (a framework for application framework framewo
Linux applications. OpenGL: a 3D graphics library. Pixel Game Maker MV: A proprietary 2D game development software for Windows and Linux applications. ReNative: The universal development SDK to build multi-platform
projects with React Native. Includes latest iOS, tvOS, Android, Android TV, Web, Tizen Watch, LG webOS, macOS/OSX, Windows, KaiOS, Firefox OS and Firefox TV platforms. Qt: an application framework and widget toolkit for Unix-like systems with X11, Microsoft Windows, macOS, and other systems—available under both proprietary and
open-source licenses. Simple and Fast Multimedia Library: A multimedia Library written in C that creates an abstraction over various platforms' graphics, sound, and input APIs. It runs on OSs including Linux, Windows
and macOS and is aimed at games and multimedia applications. Smartface: a native app development tool to create mobile applications for Android and iOS, using WYSIWYG design editor with JavaScript code editor. Tcl/Tk Titanium Mobile: open source cross-platform framework for Android and iOS development. U++: a C++ GUI framework for Android and iOS, using WYSIWYG design editor with JavaScript code editor. Tcl/Tk Titanium Mobile: open source cross-platform framework for Android and iOS development.
performance. It includes a set of libraries (GUI, SQL, etc...), and IDE. It supports Windows, macOS, iOS, Android, WebAssembly and Linux using C#. Unreal: A cross-platform SDK which uses Unreal Engine. V-Play Engine: V-Play is a cross-platform.
development SDK based on the popular Qt framework. V-Play apps and games are created within Qt Creator. WaveMaker: A low-code development tool to create responsive web and hybrid mobile (Android & iOS) applications. WinDev: an Integrated Development tool to create responsive web and hybrid mobile (Android & iOS) applications. WinDev: an Integrated Development Environment for Windows, Linux, .Net and Java, and web browers. Optimized for
business and industrial applications. wxWidgets: an open-source widget toolkit that is also an application framework.[17] It runs on Unix-like systems with X11, Microsoft Windows, and macOS. Xojo: a RAD IDE that uses an object-oriented programming language to compile desktop, web and iOS apps. Xojo supports natively compiling to Windows,
macOS, iOS and Linux, and can also create compiled web apps that are able to be run as standalone servers or through CGI. This section possibly contains original research, Please improve it by verifying the claims made and adding inline citations. Statements consisting only of original research should be removed. (March 2025) (Learn how and
when to remove this message) There are many challenges when developing cross-platform software: Testing cross-platform development as "write once,
debug everywhere", a take on Sun Microsystems' "write once, run anywhere" marketing slogan. Developers are often restricted to using the lowest common denominator subset of features which are available on all platforms. This may hinder the application's performance or prohibit developers from using the most advanced features of each platform.
Different platforms often have different user interface conventions, which cross-platform applications do not always accommodate. For example, applications developed for macOS and GNOME are supposed to place the most important button on the right-hand side of a window or dialog, whereas Microsoft Windows and KDE have the opposite
convention. Though many of these differences are subtle, a cross-platform application which does not conform to these conventions may even result in data loss, such as in a dialog box confirming whether to save or discard changes. Scripting languages and VM
bytecode must be translated into native executable code each time they are used, imposing a performance penalty. This penalty can be alleviated using techniques like just-in-time compilation; but some computational overhead may be unavoidable. Different platforms require the use of native package formats such as RPM and MSI. Multi-platform
installers such as InstallAnywhere address this need. Cross-platform execution environment for cross-platform security flaws, creating a fertile environment for cross-platform malware. [18] Operating context List of widget toolkits Hardware virtualization Language binding Source-to-source compiler Binary-code compatibility Comparison of
user features of messaging platforms ^ "Design Guidelines: Glossary". java.sun.com. Archived from the original on 2012-02-13. Retrieved 2020-10-18. ^ Lee P Richardson (2016-02-16). "Xamarin vs Ionic: A Mobile, Cross Platform, Shootout". ^ a b
"Platform Definition". The Linux Information Project. Retrieved 2014-03-27. \(^\text{"About Mono"}\), "Browser and Feature Detection". MSDN Magazine. Retrieved 28 January 2014. \(^\text{Choudhary}\), S.R. (2014). "Cross-platform testing and maintenance of web and mobile
applications". Companion Proceedings of the 36th International Conference on Software Engineering. pp. 642-645. doi:10.1145/2591062.2591097. hdl:1853/53588. ISBN 9781450327688. S2CID 1903037. ^ Mehrotra, Pranob (2020-12-01). "Collabora Office suite gets a new layout for Android tablets and Chromebooks". XDA-Developers. Retrieved
2021-01-15. Collabora Office is a popular open-source alternative to the Microsoft Office suite. It's based on LibreOffice, and it's available on a variety of platforms, including Windows, Linux, iOS, and Android Just got
Better!". Adfinis. 2020-12-15. Retrieved 2021-03-26. Retrieved 2021-03-30. the first viable self-hosted web office solution for the
popular Raspberry Pi 4 platform ^ Cribba. Quake III Arena, Giant Bombcast, February 15, 2013. ^ A Closer Look At The Dreamcast Internet Starter Kit ^ The GUI Toolkit, Framework Page ^ "Platform Independent FAQ". Archived from the original on 2008-08-16. Retrieved 2009-04-25. ^ "Cross-Platform SDK Libraries for Recognition, Document, and the original on 2008-08-16. Retrieved 2009-04-25. ^ "Cross-Platform SDK Libraries for Recognition, Document, and the original on 2008-08-16. Retrieved 2009-04-25. ^ "Cross-Platform SDK Libraries for Recognition, Document, and the original on 2008-08-16. Retrieved 2009-04-25. ^ "Cross-Platform SDK Libraries for Recognition, Document, and the original on 2008-08-16. Retrieved 2009-04-25. ^ "Cross-Platform SDK Libraries for Recognition, Document, and the original on 2008-08-16. Retrieved 2009-04-25. ^ "Cross-Platform SDK Libraries for Recognition, Document, and the original on 2008-08-16. Retrieved 2009-04-25. ^ "Cross-Platform SDK Libraries for Recognition, Document, and the original on 2008-08-16. Retrieved 2009-04-25. ^ "Cross-Platform SDK Libraries for Recognition, Document, and the original on 2008-08-16. Retrieved 2009-04-25. ^ "Cross-Platform SDK Libraries for Recognition, Document, and the original on 2008-08-16. Retrieved 2009-04-25. ^ "Cross-Platform SDK Libraries for Recognition, Document, and the original on 2008-08-16. Retrieved 2009-04-25. ^ "Cross-Platform SDK Libraries for Recognition and the original on 2008-08-16. Retrieved 2009-04-25. ^ "Cross-Platform SDK Libraries for Recognition and the original on 2008-08-16. Retrieved 2009-04-25. ^ "Cross-Platform SDK Libraries for Recognition and the original on 2008-08-16. Retrieved 2009-04-25. ^ "Cross-Platform SDK Libraries for Recognition and the original on 2008-08-16. Retrieved 2009-04-25. ^ "Cross-Platform SDK Libraries for Recognition and the original on 2008-08-16. Retrieved 2009-04-25. ^ "Cross-Platform SDK Libraries for Recognition and the original on 2008-08-16. Retrieved 2009-04-25. ^ "Cross-Platform SDK Librar
Medical, Imaging, and Multimedia", www.leadtools.com, Retrieved 2021-03-03. ^ "12 benefits of Xamarin Cross-platform app development", HeadWorks, 15 Mar 2019. ^ WxWidgets Description ^ Warren, Tom (2020-01-14), "Microsoft bids farewell to Windows 7 and the millions of PCs that still run it". The Verge, Retrieved 2020-02-06. Retrieved
```