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Linux and *Tru64* UNIX Affinity

Abstract: This white paper presents an overview of the Compaq Linux® and *Tru64*™ UNIX® Affinity Program, a key component of Compaq's overall Linux strategy. Compaq leads the industry with the widest range of hardware platforms for Linux: from iPAQ handhelds and Intel-based desktops, workstations, and *ProLiant*™ servers, to high-performance 64-bit Alpha workstation and server systems.

Affinity means:

- > Support for heterogeneous environments where *Tru64* UNIX and Linux systems interoperate and are managed seamlessly
- > The ability to develop applications on Linux and move them to *Tru64* UNIX, and vice-versa
- > Having tools that create a consistent look and feel between Linux and *Tru64* UNIX

For several years Compaq has been delivering Linux and *Tru64* UNIX Affinity with a comprehensive portfolio of open source and Compaq software backed by a robust, worldwide services capability. Our goal is to enable end-user customers, developers and vendors to integrate Linux, *Tru64* UNIX, and the power of the Compaq 64-bit Alpha architecture and *ProLiant* product family into their development and deployment environments.

No other vendor is as well positioned as Compaq to extend open source capabilities into the enterprise-computing arena. From its early involvement in Linux -- dating back to 1994 -- to its industry-leading range of Linux platforms, Compaq has the tools, technology, and talent to help the computing community reap the benefits of the open source revolution.

Linux and *Tru64* UNIX Affinity Web site:

<http://www.tru64unix.compaq.com/affinity>

Notice

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A note on naming conventions

The Linux operating system runs on a wide range of hardware platforms including the Intel IA32, Intel IA64, and the Compaq Alpha architectures. The Compaq *Tru64* UNIX operating system runs exclusively on the Alpha architecture. In this paper, when a Linux platform is specifically referenced it will be followed by the hardware architecture – Linux Intel or Linux Alpha. Linux by itself refers to both architectures. When *Tru64* UNIX is referenced, it will stand alone.

Linux and Tru64 UNIX Affinity

Underlying the development of Linux and Tru64 UNIX Affinity is the notion of *familiness* – a common look and feel, program interoperability, seamless development environments, binary application mobility, and more.

The Linux and Tru64 UNIX Affinity Program is focused on this well-defined set of goals:

- > *Interoperability within a heterogeneous environment:* Ensure that customers can combine the best in open source Linux solutions with the most robust, scalable, and easiest to manage enterprise UNIX in the market -- Tru64 UNIX.
- > *Application mobility across platforms:* Enable applications on Linux to be ported to Tru64 UNIX for increased reliability, availability, and scalability or, vice-versa, applications on Tru64 UNIX deployed on Linux systems.
- > *Common application development environment:* Simplify interoperability and support for mixed environments with Linux APIs and GNU development tools. This includes porting open source user interface tools such as KDE and GNOME to Tru64 UNIX. It also includes shared storage access and system management with Insight Manager on Tru64 UNIX and Linux Intel systems. In addition, PAWZ (Compaq Performance Analysis Web Zone), a Compaq-developed performance monitoring and management tool, has been ported to Linux Intel. PAWZ allows the analysis of performance data from multiple systems and platforms from a Web browser. For more on PAWZ, visit <http://www.testdrive.compaq.com/pawz>.

Affinity includes the ability to run common applications and databases -- Oracle on Linux Intel and Tru64 UNIX as well as Informix on Tru64 UNIX and Linux – and to run common services tools such as `sys_check` on Linux and Tru64 UNIX. A Compaq tool for analyzing the state of an operating system, `sys_check` has been ported to Linux. For more on `sys_check` visit http://www.tru64unix.compaq.com/sys_check.html.

Benefits of Affinity

Linux and Tru64 UNIX Affinity is all about application mobility -- running the same tools and applications on both Linux and Tru64 UNIX. Developers using Linux and open source tools (such as the Red Hat GNUPro software development tools) might find that their applications require a more robust and proven production environment to satisfy users. Affinity allows them to continue to develop on Linux and then deploy on Tru64 UNIX and vice versa.

With common data types, common networking, common system management tools, Storage Area Networking, and support of standards, ISVs can develop on Linux Intel-based systems such as *ProLiant* and deploy on *AlphaServer* systems running *Tru64* UNIX, Linux, or both. They can realize substantial savings and productivity gains by using Linux as their reference/development platform. Instead of having to develop applications on a variety of UNIX platforms, they can simply develop on Linux and port their software to *Tru64* UNIX as well as other UNIX environments.

UNIX end users will benefit from the vast selection of open source applications while Linux end users will benefit from the proven, enterprise-scale software environment of *Tru64* UNIX. In addition, end users will benefit from using the same user interface (for example, desktop and browsers) regardless of platform.

In summary, the benefits of Linux and *Tru64* UNIX Affinity include:

- > Simplified application development on Linux
- > Easy porting to high-end *Tru64* UNIX systems
- > Easier Linux deployment of applications running on *Tru64* UNIX
- > Reduced porting and deployment time
- > Familiar tools for developers
- > A single reference platform for ISVs
- > Flexibility to pick the optimum mix of platforms, protecting investments in applications Enterprise capabilities and power for Linux applications Access to the open source development suite on enterprise platforms
- > Common storage and systems management environment
- > Common user interface

Achieving Affinity

Linux and *Tru64* UNIX Affinity will enable our Linux customers to broaden the enterprise capabilities of Linux solutions, and enable *Tru64* UNIX customers to share in open source technologies and evolution. To make that possible Compaq will

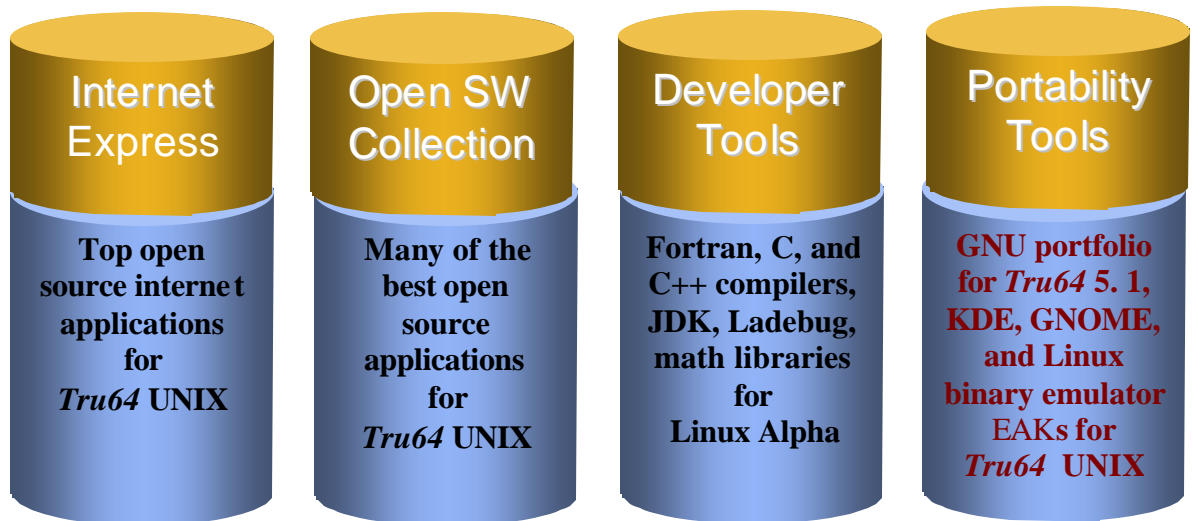
- > Create consistency and interoperability across *Tru64* UNIX and Linux on Intel and Alpha
- > Provide two-way application mobility across *Tru64* UNIX and Linux on Intel and Alpha
- > Enable development on Linux Intel or Linux Alpha with deployment on *Tru64* UNIX

Linux and *Tru64* UNIX Affinity Toolset

A key component of our Affinity Program is the Linux and *Tru64* UNIX Affinity Toolset. With this set of tools developers will have, at their fingertips, open source libraries, utilities, and applications that run on both *Tru64* UNIX and Linux systems. These tools encompass a broad spectrum of functionality including:

Command shells	Database tools	Security Tools
Command/utilities	Libraries	Developer tools
Converters	System performance tools	XML tools
Document tools	Web applications	System/daemons
Draw and paint	System management	Graphics/X applications
Editors	Media player	Desktop/window managers
File compression	Network tools	
Image utilities	Fax	

Including software for both *Tru64* UNIX and Linux systems not only provides seamless development environment but also a consistent set of applications for management of networks and servers and a common set of desktop tools and utilities. As shown here, the Affinity Toolset consists of four separate components, each of which is described below. Additional information for all components of the Toolset is available on the Linux and *Tru64* UNIX Affinity Web site at <http://www.tru64unix.compaq.com/affinity>.



Internet Express

The Internet Express CD (formerly titled Open Source Internet Solutions) provides about 45 common, Internet-related, open source applications for *Tru64* UNIX. It includes everything needed to install, create, deploy, and manage full-strength Internet or intranet applications right out of the box. The Internet Express product provides the following features and benefits:

- > A collection of open source Internet software (binaries and sources) tested and qualified on *Tru64* UNIX
- > Automatic installation and configuration of open source Internet software
- > Web-based Internet Express Administration utility to manage Internet services and tune kernel attributes for Internet service performance
- > Internet Monitor (Web-based Quality of Service monitor)
- > LDAP Module for System Authentication
- > Compaq Secure Web Server based on Apache with SSL capability
- > iPlanet Directory Server (limited by license to 200 000 entries)
- > iPlanet LDAP Software Development Kit
- > FireScreen (basic firewall based on screend)
- > Support for *TruCluster* Server -- all services are configured to run on the *TruCluster* Server providing a true high-availability environment

Applications such as the Compaq Secure Web Server (based on Apache), Samba, sendmail, SQUID, OpenLDAP, XML development tools, chat server, and Internet Monitor components are tested and qualified on *Tru64* UNIX. Internet Express includes a set of graphical user interface (GUI) tools for easy system management. Many components such as the Secure Web Server, Internet Monitor, squid proxy server, and the administration utilities are fully supported. To see a list of Internet Express V5.6 contents turn to page 13.

Open Source Software Collection

This collection of approximately 130 open source software applications includes developer and administrative utilities and multimedia and graphics packages that allow the user to exploit the power of Compaq *AlphaServer* systems running *Tru64* UNIX.

The availability of so many open source applications is a testament to the ease of portability of Linux based applications to *Tru64* UNIX. This kit uses Red Hat Package Manager (RPM)-based installation tools. The CD ships with the *Tru64* UNIX operating system. To view the Open Source Software Collection V5.1A contents turn to page 14.

Developer Tools

This software collection runs on Linux Alpha and includes Compaq C, C++, and Fortran compilers for Linux Alpha; Enterprise Tool Kit; CPML and CXML Math Libraries; Java SDK; and Ladebug. These tools have been tested with Red Hat and SuSE distributions and a version of the tool set is distributed by Red Hat and SuSE in their Linux Alpha kits. These compilers and other tools for Linux Alpha developers can be found on the Affinity Web site at <http://www.tru64unix.compaq.com/affinity>.

Linux and *Tru64* UNIX Portability Tools

An exciting new component of the Linux and *Tru64* UNIX Affinity Toolset, the portability kit has tools for both *Tru64* UNIX and Linux systems. This kit uses the RPM for installation of all packages except RPM itself, which is in the `setld` format.

GNOME and KDE

End users will also benefit from Early Adopter Kit (EAK) versions of both the GNOME V1.4 (including developers platform and GNOME office) and KDE V2. 1 (including all the internationalization components, libraries, utilities, Koffice, and others.) desktops on this kit. These components, which install in the `/usr/local` directory, are built using Compaq compilers, thus resulting in enhanced performance. Users can make simple modifications to their own Xsession startup files to use either GNOME or KDE as their own default desktop. All of the *Tru64* UNIX system management applications, (for example, SysMan Station) and most CDE applications¹ can be launched from either GNOME or KDE desktops.

Red Hat GNUPro software development tools

ISVs and developers will note the availability of Red Hat GNUPro software development tools updated to support *Tru64* UNIX V5.1 and higher including:

- > GCC, GNU C Compiler
- > G++, GNU C++ Compiler
- > BINUTILS, GNU Binary Utilities
- > GDB, GNU Debugger
- > LIBSTDC++, GNU C++ standard library compiler

Binary emulation package

Rehosting applications for which the source is not readily available is supported via an EAK Linux Alpha to *Tru64* UNIX binary emulation package, `lxct64`. This utility allows users to take applications that are

¹ The CDE file manager is a noted exception due to the tight integration with the `dtsession` manager.

built with shared objects on Linux and run them directly on a *Tru64* UNIX system. More details on porting binary applications can be found on page 10.

Code Forge IDE

A trial-use version of Code Forge, an IDE (Integrated Development Environment) that supports *Tru64* UNIX as well as Linux on *AlphaServer* and *ProLiant* systems, is included with the toolkit. This is a complete IDE that provides project management software and complete edit/compile/debug support for developers using a wide variety of programming languages and compilers including Compaq C and C++. Code Forge for *Tru64* UNIX and Linux Alpha is built using Compaq C compilers. For Linux Intel systems it is built using `gcc`.

Solaris Compatibility Libraries

Rounding out the toolkit is a set of Solaris Compatibility Libraries (SCL) for *Tru64* UNIX and Linux Alpha. The Solaris Compatibility Libraries allow applications using proprietary Solaris APIs to be more easily ported to *Tru64* UNIX and Linux Alpha systems. Many applications written for Solaris use proprietary functions that can make porting to other UNIX operating systems difficult. Compaq has eased the migration of such applications to *Tru64* UNIX and Linux Alpha by providing libraries that implement many of the Solaris APIs. This enables application source code to be ported with few or no changes and eliminates the need to write individual implementations of the Solaris functionality. The functions provided fall into three categories:

- > Solaris Threads: an implementation of Solaris thread functions layered upon POSIX threads
- > Remote Procedure Calls: a port of Sun's public domain ONC RPC v2.3 software
- > Miscellaneous: various library functions including asynchronous I/O, large file support, wide character, and signal name functions

For this release, all of the libraries are available for *Tru64* UNIX. The threads library is available for Linux Alpha. In the future, a threads library will be available for Linux Intel and FreeBSD systems. Additional SCL information including download information can be found at <http://tru64unix.compaq.com/complibs/>.

Using the Affinity Toolset to Your Advantage

Porting Applications

Application mobility is one of the three primary goals of the Linux and *Tru64* UNIX Affinity Program. The reason for this is clear: improved access to a large application base. Developers should be able to write software easily on Linux systems for deployment on Compaq *Tru64* UNIX systems and other UNIX systems. Compaq is unique in including a focus on the reverse, that is, moving an application currently available on *Tru64* UNIX to Linux Alpha.

With the Affinity Toolset, customers and developers have access to a vast collection of software to help ease the porting of applications. It is important to note that drivers are usually tightly coupled to operating system kernels and are therefore not necessarily easy to port.

Porting Source Code

In preparing to port an application, developers should install as many of the components from the Affinity Toolset as thought necessary. This will provide access to components such as RPM, CVS, build tools, the GNUPro software development tools, and Compaq compilers.

If you choose to use the Compaq C or C++ compiler you can take advantage of numerous extensions that provide compatibility with the GNU C compiler (`gcc`). You can update your makefiles to use the `-std gnu` option. The compiler driver (`cxx`) accepts many common `gcc` command line options or a mixture of *Tru64* UNIX options and `gcc` options. We recommend using this compiler to ensure the best application performance on both *Tru64* UNIX and Linux Alpha systems.

The Redhat GNUPro set of software development tools is available for users who wish to use `gcc` and its associated tools for porting.

The key to porting any software is to just go ahead and try a build. Because of the high degree of compatibility between Linux and *Tru64* UNIX systems, this will succeed most of the time. In the event that there are some problems there are several options available.

First, check to see if you have the Porting Assistant, a GUI-based utility named `port` (1), installed on your *Tru64* UNIX system. To download a copy of the Porting Assistant see <http://www.tru64unix.com/tools.html>. The Porting Assistant is also available on the *Tru64* UNIX Associated Product CD.

The Porting Assistant can help you identify potential problem areas such as conditional code, header file references, and incompatible library functions or system calls. What's more, the Porting Assistant helps identify places in code that may have 32-bit dependencies. This is important when porting from Linux Intel platforms to either Linux Alpha or *Tru64* UNIX systems.

There can be dependencies on multiple packages that can result in difficulties configuring large applications. Solving this type of problem may be as simple as installing the necessary applications from the *Tru64* UNIX Open Source Software Collection.

Developers should note that Linux does not currently support the UNIX98 or POSIX standards. This means that when porting from *Tru64* UNIX to Linux, developers need to be aware of the use of APIs that are specific to these standards. Applications that use threads are not currently portable to Linux.

Porting Binary Applications

Many *Tru64* UNIX users have found that about 80% of applications built for *Tru64* UNIX can be run on a Linux Alpha system simply by copying the binaries. In some cases you may need to install the Linux Alpha kit for Netscape and the subset of *Tru64* UNIX libraries that are included in the kit. The ability to port *Tru64* UNIX binary applications directly to Linux Alpha is testimony to the close collaboration between the Compaq engineering community and Linux developers. To download a copy of the Linux Alpha Netscape 4.7-3 kit, go to <http://www.support.compaq.com/alpha-tools/software>.

To run Linux Alpha binary applications to *Tru64* UNIX, the Linux Portability Tools collection provides a utility, `lxt64`, which enables users to run shared applications built on Linux Alpha on their *Tru64* UNIX system. This utility provides updates to the GNU library, `glibc`, to provide compatibility with *Tru64* UNIX system calls. Linux system calls are not implemented in `lxt64` so applications of the sort found in `/usr/sbin` and `/sbin` are not supported. The `lxt64` utility provides an ELF loader that bootstraps the ELF dynamic linker to load the program image and the shared libraries. Users can run Linux Alpha binaries either by executing this command

```
lxt64 program_name program_arguments
```

or by updating the shell startup scripts, `/etc/csh.login` or `/etc/profile` to allow the new loader to run silently. In this case, when a user invokes a command or application, the correct loader, either ELF or COFF, will be started.

Summary: A Comprehensive Linux Environment

Compaq leads the industry with the widest range of hardware platforms for Linux: from iPAQ handhelds and Intel-based desktops, workstations, and *ProLiant* servers, to high-performance 64-bit Alpha workstation and server systems. In addition, Compaq offers end-to-end solutions and services for the Linux development community.

Software engineering and standards development

Compaq engineers have been part of the Linux community since May of 1994, making major contributions to the development of Linux on Alpha systems. Our employees have also participated in many Linux activities. In fact, Compaq is a sponsoring corporate member and was the first system vendor to join Linux International -- a vendor organization devoted to the promotion of Linux.

In addition to ongoing development of Linux Alpha, Compaq contributes to the Linux community through its support of, and participation in, many organizations including:

- > GNOME Foundation
- > KDE League
- > LI18NUX Committee
- > Linux Standard Base, LSB
- > The Open Group
- > X.ORG
- > Xfree86
- > The Linux Kernel Archive
- > Free Standards Group
- > handhelds.org

The Linux operating system and the Linux Alpha community have supported Compaq Alpha products since November of 1995 when Red Hat Software, Inc., released the first full non-Intel distribution of Linux for Alpha. Linux Alpha is a true 64-bit implementation that allows for higher-precision mathematics as well as larger address spaces.

Compaq's depth and experience base in UNIX engineering development justifies a capability supporting both 32- and 64-bit Linux architectures. Teams of engineers develop, test, and maintain software for technologies found on both Intel and Alpha processor platforms. Compaq aids the support of Linux by contributing software to the Linux kernel.

Service and support

Pre- and post-sales services are available for customers evaluating, planning, and deploying Linux solutions from Compaq. Web-based product support, downloadable software, technical white papers, systems engineer training, and worldwide telephone support round out the comprehensive solutions portfolio. The

Compaq *ActiveAnswers* Web site provides extensive information on planning, operating, and developing business solutions for Linux.

Alliances

Compaq qualifies its hardware with the major Linux distributions to give our customers and partners the greatest flexibility to meet their needs. Partnerships with key Linux distributions ensure better integration and support for customers and partners. At the corporate level, Compaq has alliances with Caldera Systems, Red Hat, SuSE, and TurboLinux. We are engaged with them in a continuous process of testing, verifying, and certifying Linux for Compaq's comprehensive portfolio of platforms and options. At the country or geography level, Compaq also has local alliances with other Linux distributions such as Digital Factory's Kondara/MNU in Japan and Red Flag in China. Many other Linux distributions are also available for both *ProLiant* and *AlphaServer* hardware platforms including Mandrake, Debian, and Slackware. For more on Linux alliances visit <http://www.compaq.com/linux>

A focus on Linux

To leverage the maturity and robustness of the Compaq *Tru64* UNIX operating system with the popularity of Linux, the Affinity Program will ensure our customers:

- > Comprehensive support for developers and channels
- > An extension of Compaq technology to Linux and open source
- > A Linux portfolio of systems, storage, clients, and applications
- > A full suite of global services
- > Best-of-breed UNIX

From open source to the enterprise

No other vendor is as well positioned as Compaq to extend open source capabilities into the enterprise-computing arena. From its early involvement in Linux -- dating back to 1994 -- to its industry-leading range of Linux platforms, Compaq has the tools, technology, and talent to help the computing community reap the benefits of the open source revolution.

Appendix: Software Lists

Internet Express V5.6 Open Source Software

The contents of the Internet Express are updated 3 times a year. Listed below are the contents of July 2001 distribution. Visit <http://www.tru64unix.compaq.com/affinity> for updated information.

Perl V5.6.0	ProcMail 3.15.1
Tcl V8.3.1	Qualcomm popper POP3 V3.0.2
Tk V8.3.1	UW IMAP 2000.283
TclX V8.2.0	Cyrus IMAP4 V1.6.24
expect 5.32.1	RID 1.12 (Remote Intrusion Detector)
tcl_cgi 1.6x	IRC V2.10.3p1
Xerces-C 1.4 (C++)	Samba 2.0.9
Xerces-J 1.2.3 (Java)	wu-ftpd V2.6.1
Xalan-J 1.2.2	Squid V2.3.STABLE4
FOP 0.15.0	calamaris v2.40
Cocoon 1.8.2	SmartFilter 3.0
Apache V1.3.19.4	Majordomo V1.94.5
mod_ssl-2.8.1-1.3.19	TCP Wrapper V7.6
openssl-0.9.6	PostgreSQL 7.1
mod_frontpage/4.0.4.3	SATAN 1.1.4
auth_ldap 1.4.5	Pine 4.30
Jakarta Tomcat 3.2	Tin 1.4.4
php-4.0.4pl1	Lynx V2.8.3
mod_fastcgi-2.2.8	OpenLDAP 2.0.7
analog4.03	Darwin Streaming Server 3.0 Preview [v240]
FrontPage 2000 Server Extensions V4.0 SR 1.1	Dante SOCKS server 1.1.9
INN V2.3.1	Apache 2.0 Early Access Kit
Sendmail V8.11.1	

Compaq developed components

Internet Express Administration Utility (including FireScreen)
 Compaq Secure Web Server Administration Utility
 Internet Monitor
 Internet Express LDAP Module for System Authentication

Third-party components

Interlink Networks AAA Server 4.3.2B 3
 iPlanet Directory Server 4.13
 iPlanet LDAP SDK FOR C 4.1
 Delegated Administration
 Tarantella Enterprise III (evaluation kit)
 Halcyon iASP 1.0.8
 Secure Computing SmartFilter 3.0

Open Source Software Collection V5.1A

The contents of the *Open Source Software Collection* are updated for each major Tru64 UNIX release. Listed below are the contents of the Tru64 UNIX V5.1A distribution. Visit <http://www.tru64unix.compaq.com/affinity> for updated information.

ACE-5.1	gmake-3.79.1	sced-1.02
Acrobat-4.05	gnuplot-3.7	sedt-4.1
EmiClock-1.0.2	grep-2.4.2	sh-utils-2.0
FileRunner-2.5.1	gs-6.50	syd-3.2a
HDF4-1r2	gtar-1.13	tcp_wrappers-7.6
ImageMagick-5.3.0	gtk+-1.2.8	tcpdump-3.5
ORBit-0.5.3	guile-1.4	tcsh-6.09.00
ORBit-devel-0.5.3	gv-3.5.8	teTeX-1.0.7
TiMidity+-2.7.0	htmltidy-0.8.4	texinfo-4.0
Xaw3d-1.3	imlib-1.9.8.1	tgif-3.0p16
XmHTML-1.1.0	imlib-16bit-1.9.8.1	tiff-v3.4beta037
a2ps-4.13	indent-2.2.6	timidity-patches-01
aXe-6.1.2	ispell-3.1.20	tkman-2.1
august-0.63b	jbigkit-1.0	top-3.5beta5
autoconf-2.13	jpeg-6b	transfig-3.2.1
automake-1.4	less-358	unzip-5.40
bash-2.04	lftp-2.3.10	urt-3.1b
bc-1.05	libpcap-0.6.2	vim-common-5.7
bind-8.1.2	libpng-1.0.8	vim-gtk-5.7
bison-1.28	libtcl_tk-8.3.1	vim-motif-5.7
bluefish-0.6	libtool-1.3.5	vim-terminal-5.7
bzip2-1.0.1	libungif-4.1.0b1	vmubc-v5
cdrecord-1.6.1	libwmf-0.1.21	vxt-v2.1
cpio-2.4.2	libxml-1.8.11	w3c-libwww-5.3.1
cscope-15.1	llnxdir-2.1	weblint-1.9.3
cvs-1.11.1p1	lsf-4.51	wget-1.6
cygnus_doc-99r1	lynx-2.8.3	whirlgif-2.01
cygnus_gcc-g++-99r1	mkisofs-1.12b4	xanim-2.80.1
db-2.7.7	m4-1.4	xarchie-2.0.10
diffutils-2.7	monitor-1.8	xbmbrowser-5.1
emacs-20.7	mpack-1.5	xchat-1.2.1
emu-2.34	mpeg_lib-1.3.0	xdemineur-2.1.1
enscript-1.6.1	mpeg_play-2.4	xeb_2.1
fileutils-4.0	mrolo-13	xfig-3.2.2
findutils-4.1	mwordview-0.5.2	xfsm-1.97
flex-2.5.4	ncurses-5.2	xless-1.7
freetype-1.1	nedit-5.1.1	xmaddressbook-1.5.3
freetype2-2.0.1	nedit-HTML-Doc-5.1.1	xpaint-2.6.1
gawk-3.0.3	netpbm-1mar1994	xperifonPlus-1.6
gdbm-1.8.0	patch-2.5.4	xpm-3.4k
gettext-0.10.35	pine-4.21	xspread-3.0
ghostscript-fonts-other-6.0	povray_lib-3.1g	xtar-1.4
ghostscript-fonts-std-6.0	povray_src-3.1g	xv-3.10a
ghostview-1.5	pstotext-1.8	zephyr-2.0.4
giftrans-1.12	python-2.0	zip-2.2
gimp-1.0.4	ralcgm-3.50	zlib-1.1.3
gimp-data-extras-1.0.0	readline-4.1	zsh-3.1.9
glib-1.2.8	rman-3.0.9	

Developer Tools

These compilers and other tools for Linux Alpha developers can be found on the Linux and *Tru64 UNIX* Affinity Web site at <http://www.tru64unix.compaq.com/affinity>

- > Compaq Portable Math Library (CPML)
 - > Compaq Extended Math Library for Linux Alpha
 - > Compaq C Compiler Version 6.2 for Linux Alpha
 - > Compaq Fortran on Linux Alpha Systems X1.0.1 Release
 - > C++ compiler for Linux Alpha Ver.cxx-6.3.9.6-5
- > Linux Alpha server for the Enterprise Toolkit V2.5
 - > Special release of Ladebug debugger with the Compaq Fortran, C, and CXX Compilers for Linux Alpha
 - > Technical Programming Extensions for Enterprise Toolkit

LINUX and Tru64 UNIX Portability Tools

Visit <http://www.tru64unix.compaq.com/affinity> for updated information.

Open Source components

bison-1.28	kde toys-2.1	gtm-0.4.7-1
flex-2.5.4a	kdeutils-2.1	guile-1.4-2
jade-3.2	kdevelop-1.4	imlib-1.9.10-1
kde-i18n-ca-2.1	kdoc-2.1	imlib-16bit-1.9.10-1
kde-i18n-cs-2.1	koffice-2.0.1	jpilot-0.99-1
kde-i18n-da-2.1	libtool-1.4	less-358-1
kde-i18n-de-2.1	m4-1.4	libghttp-1.0.9-1
kde-i18n-el-2.1	openssl-0.9.6aCrux-	libglade-0.16-1
kde-i18n-eo-2.1	200102142043-1	libiconv-1.6-1
kde-i18n-es-2.1	ImageMagick-5.2.8-2	libjpeg-6b-1
kde-i18n-et-2.1	ORBit-0.5.7-4	libole2-0.2.1-1
kde-i18n-fi-2.1	audiofile-0.2.1-1	libpcap-0.6.2-1
kde-i18n-fr-2.1	bison-1.28-2	libpng-1.0.6-1
kde-i18n-he-2.1	bonobo-1.0.3-1	librep-0.13.6-1
kde-i18n-hu-2.1	bug-buddy-2.0.1-1	libsic++-1.0.3-1
kde-i18n-is-2.1	bzip2-1.0.1-1	libtiff-3.5.6-1
kde-i18n-it-2.1	control-center-1.4.0.1-1	libtool-1.3.5-4
kde-i18n-ja-2.1	db3-3.1.17-3	libungif-4.1.0-1
kde-i18n-ko-2.1	esound-0.2.22-2	libunicode-0.4.gnome-2
kde-i18n-nl-2.1	freetype-2.0-1	libxml-1.8.11-2
kde-i18n-no-2.1	gconf-1.0.0-4	libxml2-2.3.8-1
kde-i18n-no_NY-2.1	gdbm-1.8.0-3	m4-1.4-2
kde-i18n-pl-2.1	gdk-pixbuf-0.11.0-1	ncurses-5.2-2
kde-i18n-pt-2.1	ggv-1.0-1	oaf-0.6.5-2
kde-i18n-pt_BR-2.1	ghex-1.2-1	pan-0.9.2-1
kde-i18n-ro-2.1	ghostscript-5.50a-3	patch-2.5.4-2
kde-i18n-ru-2.1	ghostscript-fonts-6.0-2	popt-1.6.2-4
kde-i18n-sk-2.1	glade-0.6.2-1	python-2.0-4
kde-i18n-sl-2.1	glib-1.2.10-2	readline-4.1-3
kde-i18n-sr-2.1	gmake-3.79.1-4	rep-gtk-0.15-5
kde-i18n-sv-2.1	gmp-3.1.1-2	sawfish-0.38-2
kde-i18n-tr-2.1	gnome-applets-1.4.0.1-2	scrollkeeper-0.2-3
kde-i18n-uk-2.1	gnome-audio-1.4.0-1	texi2html-1.64-4
kde-i18n-zh_CN.GB2312-2.1	gnome-core-1.4.0.4-1	texinfo-4.0-3
kde-i18n-zh_TW.Big5-2.1	gnome-games-1.4.0.1-1	unzip-5.41-1
kdeadmin-2.1	gnome-libs-1.2.13-1	wget-1.6-1
kdebase-2.1	gnome-pim-1.4.0-1	xalf-0.12-1
kdebindings-2.1	gnome-python-1.4.1-3	xpm-3.4k-1
kdegames-2.1	gnome-utils-1.4.0-1	xscreensaver-3.30-1
kdegraphics-2.1	gnome-vfs-1.0-2	zip-2.3-1
kdelibs-2.1	gqmpeg-0.9.0-2	zlib-1.1.3-1
kdemultimedia-2.1	grdb-0.2.4-2	perl5.005_03
kdenetwork-2.1	gtar-1.13-4	python1.5
kdepim-2.1	gtk+-1.2.10-1	qt-x11-2.3.0
kdesdk-2.1	gtk-engines-0.12-1	
kdesupport-2.1	gtkhtml-0.8.3-1	

LINUX and *Tru64* UNIX Portability Tools (continued)

Compaq developed components

lx64 binary emulator
SCL commands: ptime, rpcbind, rpcgen, rpcinfo
SCL documentation
SCL examples
SCL Header files
SCL libraries: libxti, librpc, lthread, lsolm

Third-party components

Code Forge IDE
Red Hat GNUPro Software Developers Tools