

The Single UNIX® Specification, Version 2 and UNIX 98

A Technical White Paper from the Open Group.

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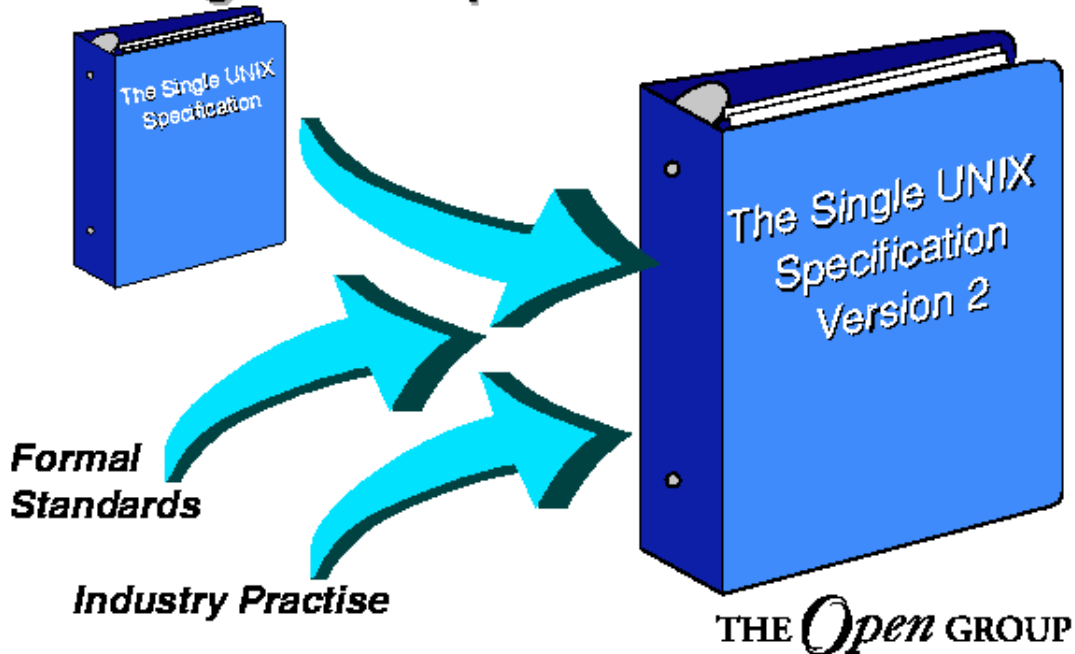
Abstract

Developed through the X/Open consensus process the Single UNIX Specification Version 2 and the UNIX 98 Product Standards introduce the next generation of 64-bit enabled UNIX system architectures, and reinforce the UNIX trade mark as the industry recognized mark for the leading-edge operating environment.

This delivers to the market the benefits of a single standard operating system, namely application and information portability, scalability, flexibility and freedom of choice for customers.

Continuing its commitment to Open Systems, The Open Group is pleased to announce availability of the Single UNIX Specification, Version 2 on the World Wide Web at URL <http://www.UNIX-systems.org/go/unix>.

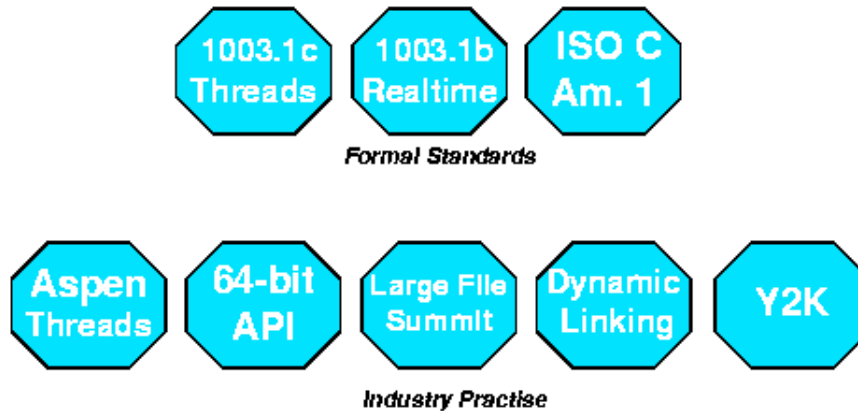
The Single UNIX Specification Version 2



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Version 2 of the Single UNIX Specification builds upon the original and updates it with the latest formal standards and the latest industry practises.

In particular it introduces the following functionality into the core definitions:



- Alignment with the latest formal standards:

- ISO/IEC 9945-1:1996 which incorporates ANSI/IEEE Std POSIX 1003.1-1990, 1003.1b-1993, 1003.1c-1995 and 1003.1i-1995 [1003.1b-1993 and 1003.1i-1995 are Realtime extensions . 1003.1c-1995 is Threads extensions.]

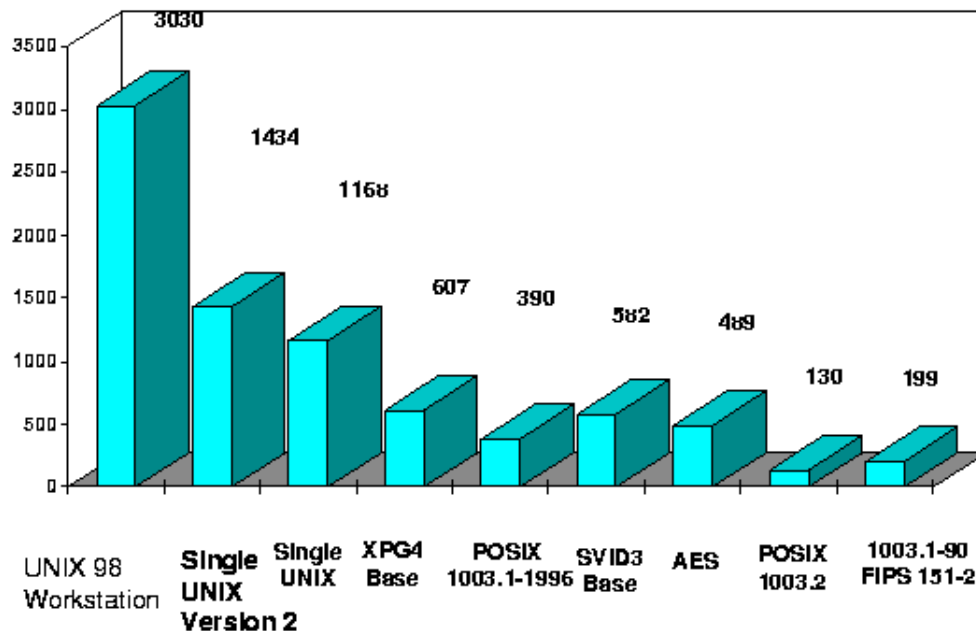
The Realtime extensions are an optional feature group, allowing procurement of X/Open realtime systems with predictable , bounded behavior.

Threads interfaces, fully aligned with the POSIX Threads Extension, permit development of applications to make significant performance gains on multiprocessor hardware.

- Multibyte Support Extension (MSE) aligned with ISO C Amendment 1: 1995 to further support internationalised applications.

- Large File extensions to permit UNIX systems to support files of arbitrary sizes, this is of particular relevance to database applications.
- Extended Threads functions (known as Aspen Threads) over POSIX threads, based on industry input from Sun, Digital, HP and DCE.
- Dynamic linking extensions to permit applications to share common code across many applications, and ease maintenance of bug fixes and performance enhancements for applications.
- Changes to remove hardware data-length dependencies or restrictions. This is known as the N-bit cleanup (64 bit and beyond) . This is of particular relevance with the ongoing move to 64 bit CPUs.
- Year 2000 Alignment to minimize the impact of the millennium rollover.

Portability functions



For those of us who count interfaces, the Single UNIX Specification Version 2 now has over 1400 programming interfaces. The UNIX 98 Workstation profile which includes CDE (and thus X11 and Motif) increases this number to over 3000 programming interfaces.

What is UNIX 98 ?

UNIX 98 is the mark (or label) for systems conforming to Version 2 of the Single UNIX Specification.

UNIX 98 is

- A brand that can be applied to systems that conform to the Single UNIX Specification Version 2.
- A significant enhancement over XPG4 UNIX (UNIX 95)

If a product is registered as conformant to UNIX 98 the vendor warrants and represents that it:

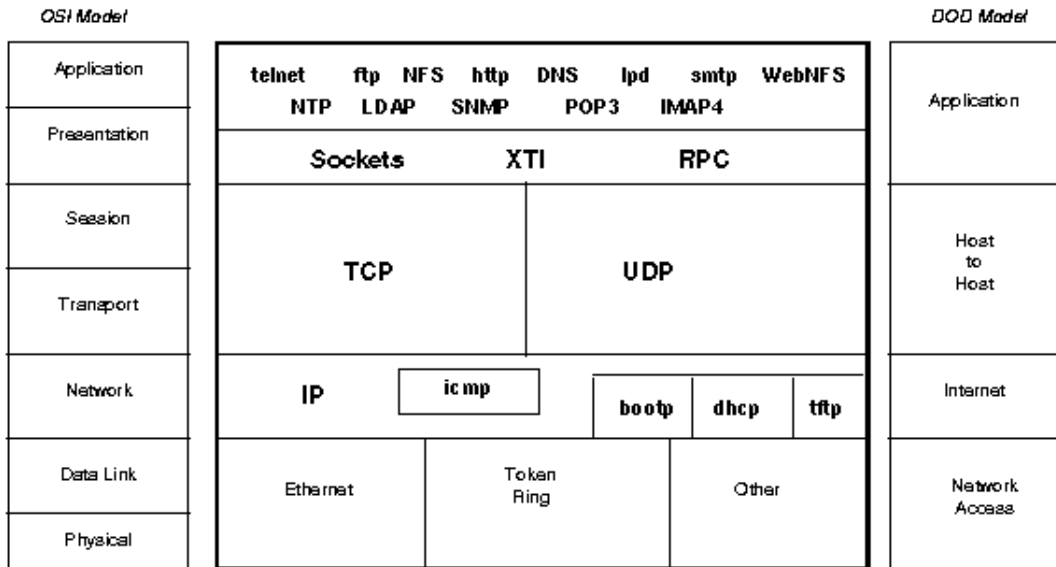
- Complies with the specifications
- Will continue to comply with the specifications
- If a non-compliance is found it will be fixed in a prescribed timescale.

UNIX 98 is organized as a family of product standards addressing different market needs.

- UNIX 98
 - The *base* product standard.
- UNIX 98 Workstation
 - The *base* product standard plus the Common Desktop Environment (CDE)

- UNIX 98 Server
 - Captures existing de-facto practice for internet/intranet services. The additional functionality over the *base* UNIX 98 functionality includes:
 - The Internet Protocol Suite
 - Java Support
 - Internet capabilities to support network computing

The following diagram shows the internet services included in the UNIX 98 Server product standard:



Benefits

Benefits for Application Developers

- Greater consistency amongst UNIX® operating systems.
- Improved portability.
- Faster development through the increased number of standard interfaces.
- More innovation is possible, due to the reduced time spent porting applications

Benefits for Users

- This is an evolution of the the XPG4 UNIX (UNIX 95) brand, therefore protecting users investment in existing systems and applications.
- The availability of UNIX systems from multiple suppliers gives users freedom of choice rather than being locked in to a single supplier.

UNIX 98 Standards Feature Matrix

Feature	UNIX 95	UNIX 98	UNIX 98 WorkStation	UNIX 98 Server
System Software				
POSIX.1	X	X	X	X
POSIX.2	X	X	X	X
POSIX.1b		X*	X*	X*
POSIX.1c		X	X	X
FIPS 151-2	X	X	X	X
FIPS 189	X	X	X	X
ISO C	X	X	X	X
ISO C Amendment 1		X	X	X
XSockets	X	X	X	X
XTI	X	X	X	X
XCURSES	X	X	X	X
X/Open Threads Extension		X	X	X
Y2K Changes		X	X	X
Dynamic Linking		X	X	X
Large File Support		X	X	X
Data Size Neutral		X	X	X
User Interface				
CDE			X	
Motif			X	
X11 Window Server			X	

Continued overleaf.....

UNIX 98 Standards Feature Matrix Cont'd..

Feature	UNIX 95	UNIX 98	UNIX 98 WorkStation	UNIX 98 Server
Internet Standards				
Java Runtime Environment 1.1				X
Java Class Libraries 1.1				X
TCP/IP IPv4				X
HTTP 1.1 Server				X
SSL V3 Server				X
DNS Server				X
Secure DNS Server Extensions				X
Telnet Server				X
Ftp Server				X
NFS Server				X
WebNFS Server				O
POP3 Server				X
IMAP4 Server				X
SMTP Server				X
LPD Server				X
NTP Server				X
LDAP V2 Server				X
LDAP V3 Server				O
SNMP Agent				X
DHCP Server				X
TFTP Server				X
BOOTP Server				X

O=Optional

*=Realtime Feature Group

UNIX vs POSIX Feature Matrix

Feature	FIPS 151-2	UNIX 95	UNIX 98
1003.1-90 Processes	Multiple	Multiple	Multiple
1003.1-90 Pipes	X	X	X
1003.1-90 Files and Directories	X	X	X
1003.1-90 Basic I/O	X	X	X
1003.1-90 Async I/O	X	X	X
1003.1-90 Signals	X	X	X
1003.1-90 Users and Groups	X	X	X
1003.1b-93 File Synchronization		X	X
1003.1b-93 Memory Mapped Files		X	X
1003.1b-93 Memory Protection		X	X
1003.1b-93 Process Priority Scheduling			Realtime FG
1003.1b-93 Memory Locking			Realtime FG
1003.1b-93 Synchronized I/O			Realtime FG
1003.1b-93 Asynchronized I/O			Realtime FG
1003.1b-93 Hi Resolution Clocks & Timers			Realtime FG
1003.1b-93 Realtime Signals			Realtime FG
1003.1b-93 Semaphores			Realtime FG
1003.1b-93 Shared Memory			Realtime FG
1003.1b-93 IPC Message Passing			Realtime FG
1003.1c-95 Threads			X
1003.1c-95 Thread Safe Functions			X
1003.1c-95 Thread Attribute Stack Address			X
1003.1c-95 Thread Attribute Stack Size			X
1003.1c-95 Thread Process Shared			X
1003.1c-95 Thread Priority Scheduling			Realtime Threads FG
1003.1c-95 Thread Priority Inheritance			Realtime Threads FG
1003.1c-95 Thread Priority Protection			Realtime Threads FG
1003.2/2a Shell & Utilities		X	X
P1003.1g (DRAFT) Protocol Independent Interfaces			X

FG=Feature Group

New Test Suites for UNIX 98

Open Group test tools are essential for proper development and maintenance of standards-based products, ensuring conformance of products to industry-standard APIs, application portability and interoperability. In-depth testing identifies defects at the earliest possible point in the development cycle, saving costs in development and quality assurance. The real benefit of The Open group test tools to suppliers is accelerated time-to-market of branded product.

Several new test suites are being introduced with UNIX 98.

- VSTH - The industry standard Threads test suite : a standalone test suite fully covering POSIX 1003.1c and the additional X/Open threads (Aspen) requirements. The suite has a common operating and reporting interface consistent with VSX, and is capable of being merged with VSX. The consistency is achieved using the VSX generic harness, known as VSXgen.
- VSRT - The industry standard POSIX Realtime test suite: a standalone test suite fully covering POSIX 1003.1b and POSIX 1003.1i. The suite has a common operating and reporting interface consistent with VSX, and is capable of being merged with VSX (under VSXgen).
- VSX5 - a new test suite which runs under the VSXgen harness: includes tests for ISO C Amendment 1, Dynamic Linking and Large File Summit extensions. This suite is capable of being merged in with other test packages running under VSXgen.
- A major upgrade of VSC, the industry standard Commands & Utilities test suite: includes Large File Summit extensions, n bit clean, Aspen commands and year 2000 alignment.
- A major upgrade of VSU, the industry standard test suite for Sockets, Curses and other UNIX extensions: includes Large File Summit extensions and n bit cleanup for the traditional UNIX extensions; revised Sockets tests for XNS Issue 5; a major upgrade of the Xcurses tests which are revised for X/Open Curses Issue 4 Version 2.
- A maintenance update of VST, the industry standard XTI test suite: includes n bit cleanup.

For more information on new developments in Open Group testing , see <http://www.opengroup.org/testing/new>.

More Information

More information on the Single UNIX Specification, Version 2 can be obtained from the following sources:

- The Open Group Source Book "Go Solo 2 - The Authorized Guide to Version 2 of the Single UNIX Specification", 500 pages, ISBN 0-13-575689-8. This book provides complete information on what's new in Version 2 , with technical papers written by members of the working groups that developed the specifications , and a CD-ROM containing the complete 3000 page specification in both HTML and PDF formats (including PDF reader software). For more information see URL <http://www.opengroup.org/unix/gosolo2/>.
- More information on the Single UNIX Specification , including the online version of the specification can be obtained at The Open Group's official UNIX system world wide web site, see the URL <http://www.UNIX-systems.org/>.

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