POSIX® : Certified by IEEE and The Open Group – a briefing.

The Source for POSIX Certification

http://posixcertified.ieee.org

April 2005.
Agenda

- What is POSIX?
- POSIX 1003.1, 2004 Edition Status
- POSIX 1003.13-2003
- POSIX: *Certified by IEEE and The Open Group*
POSIX® /pahz–icks/

- POSIX, pronounced pahz–icks as in positive, not poh–six, or other variations
- POSIX is a registered trademark of the IEEE
  - Licensed through certification
- An acronym for Portable Operating System Interface
POSIX® /pahz-icks/

- POSIX is a family of standards developed by the Portable Applications Standards Committee (PASC) of the IEEE Computer Society

- Main subject areas:
  - System Interfaces (C, Fortran, Ada Bindings)
  - Commands & Utilities
  - Test Methods
What is POSIX?

- It's about *portability*
  - Both programmers and application source code
  - Portability of the OS kernel itself and/or application binary code are *not* objectives
- POSIX is a set of books specifying APIs
  - It is neither a piece of code
  - Nor an operating system
  - It is a rich, proven API
What is an API?

- Application Program Interface
- A written contract between system developers and application developers
- It is not a piece of code, it is a piece of paper defining what the two sets of developers are guaranteed to receive and are in turn responsible for providing
The Need for Standard APIs

- Standardized “square” peg in the round hole
  - “bits where change is not interesting”
  - Where the benefits of commonality outweigh the value of differences
  - Where we can achieve economies of scale, including interoperability
Application Environment Profile Landscape

1003.1-2001
1003.1-1996
1003.1-1990
FIPS 151-2
ELCPS, LSB
ISO C
ISO C++
POA
C/C++
Naming
OMG CORBA/COS
Minimal Application Profiles (1003.13)

Source: QNX.
Scalable API Portability

POSIX 1003.1, 2004 Edition

- Approved December 6th 2001
- 2004 Edition incorporates two Technical Corrigenda
- Developed by the Austin Group (see later)
- Supersedes all the major POSIX standards except 1003.13 (realtime profiles) and 1003.5 (Ada bindings)
- A combined system interfaces (including all realtime POSIX) and utilities specification as a single 4000 page standard
- The core of DoD’s mandated Joint Technical Architecture (JTA) OS Services, replacing 1003.1-1996 and its amendments
- Technically identical to the Base specifications of the Single UNIX Specification and ISO 9945
The Common *Base* Specifications

IEEE Std 1003.1,
ISO/IEC 9945
The Open Group Base Specifications Issue 6

*The Core of the Single UNIX Specification V3*
The Austin Group

- The Austin Group combines the formal standards process of the IEEE and ISO, with the industry standards of The Open Group and the community at large.
- Electronic participation
- Participation in the group is free.
- The final standard in html is available for free download from the world wide web.
POSIX 1003.13-2003

- Approved December 10\textsuperscript{th} 2003
- A set of POSIX Realtime profiles
- Supersedes POSIX.13-1998 updated to address
  - 1003.1-2001 (which includes all of realtime POSIX)
  - Profiles of all 1003.5-series standards (Ada bindings to POSIX)
  - Field experience with 1003.13-1998
  - Input from the Linux, realtime and/or embedded Linux, and traditional RTOS communities
POSIX 1003.13 Profiles

**Profile 54:** 1003.1-2003 *Base* Multi-process, Threads, File System

**Profile 53:** Multi-process, Threads; File System

**Profile 52:** Single Process, Threads, File System

**Profile 51:** Single Process, Threads; No File System

Portable Operating System Interface
IEEE Standard POSIX 1003.13

Allows Portability of Applications
POSIX 1003.13

- POSIX 1003.13 is a subprofile standard of 1003.1-2001
  - It allows diverse realtime operating systems “clothed” with a runtime library to comply
  - This standardizes the application-to-RTOS API, allowing considerable application code portability between different RTOS offerings, which portability had not been possible in the past
  - RTOS+wrapper offerings can be compared and competed directly
  - There are currently four profiles
Resources

- The Austin Group ("Base Standard")
  - [http://www.opengroup.org/austin/](http://www.opengroup.org/austin/)
- PASC SSWG-RT
  - [http://www.pasc.org/sswg-rt](http://www.pasc.org/sswg-rt)
Portability vs. Conformance

- **Portability**
  - Degree to which a software / application base is reusable
    - Between different versions of the same vendor’s environment
    - Between different vendors environments
  - Measurement
    - Difficult to verifiably measure
    - Portability from one environment to another is *not* a reliable metric of how portable it will be to other environments,
    - *Except* under constrained circumstances

- **Conformance**
  - One approach to providing a verifiable metric of portability on an application by application basis
    - Essentially pass/fail
  - Two Sides:
    - Vendor conformance: conformant implementation
    - Consumer conformance: conforming application

Source: QNX
POSIX® Certified
by IEEE and The Open Group

How compliance claims can be proven....
Program Principles

- Clear and well-defined:
  - certification policies
  - processes for achieving and maintaining certification
  - based on industry best practice.
- Certification backed up by conformance testing
Certification Agreement

- Vendor guarantee of conformance to specifications.
  - Vendor 'Warrants & Represents'
- This guarantee ensures that:
  - Products conform to a specification
  - Products remain conformant throughout the life of the product’s registration
  - Any non-conformance will be fixed in a timely manner
Benefits of Certification(1)

- For Procurement:
  - Assurance of POSIX conformance and interoperability
  - Level of assurance matched to the needs of the particular application
Benefits of Certification (2)

- Suppliers can demonstrate and provide objective evidence to their customers that their products are compliant with the industry recognized 2003 edition of IEEE 1003.1 POSIX Standard.

- Products that successfully pass all the test suites and obtain a related certification certificate are able to carry the POSIX Certified trademark.
1003.1-2003 Base Certification

- Certification for the *Base mandatory* features of POSIX 1003.1
- 1003.1-2003 System Interfaces
  - Mandatory POSIX System Interfaces
  - Tested by VSX-PCTS2003
- 1003.1-2003 Shell and Utilities
  - Mandatory POSIX Shell & Utilities
  - Tested by VSC-PCTS2004
POSIX 1003.1, 2003 Test Suites

VSX-PCTS 2003
System Interfaces & Headers

VSC-PCTS 2003
Shell & Utilities

VSXgen - Generic test suite layer

Test Environment Toolkit, (TET3.6-lite)
Coming soon... 1003.13 Certification

- Initially PSE54:2003 Certification
  - Covers in addition Realtime options from 1003.1
  - Pilot program for certification program in October/November 2004
  - PSE54 Test suite GA December 2004
  - Conformance requirements developed with those companies participating in pilot
  - Certification open for business End April?
  - Expected to be basis for DoD procurements

- Proposed developments in 2005
  - PSE53:2003 certification subject to funding
POSIX 1003.13 PSE54, 2003 Test Suites

VSPSE54:2003
System Interfaces & Headers,
(includes threads and realtime options)

VSC-PCTS 2003
Shell & Utilities
(Includes tests for SDO and UP)

VSXgen - Generic test suite layer

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