The UNIX® Operating System
- *Mature, Standardized and State-of-the-Art*

http://www.UNIX-systems.org

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Agenda

– **The UNIX® System, Past and Present**

– **The Value of Standards**

– **The Single UNIX Specification**

– **UNIX 98 Product Standards**

– **The UNIX System Strengths**

– **The UNIX System and Microsoft® Windows NT®**

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The UNIX® Operating System: Mature, Standardized and Start-of-the-Art

- Continual development over the last twenty-five years
- Deployed in millions of installations on nearly every hardware platform
- A reputation of stability and scalability
- Continued innovation as new technologies assimilated

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UNIX® Past Perceptions

- Uncompromising
- Command line interface required technical competence
- Command line syntax not intuitive
- Interface unfriendly
- Security often nonexistent

- Today, these perceptions are only of historical interest.

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UNIX Past

Specification

Product

UNIX
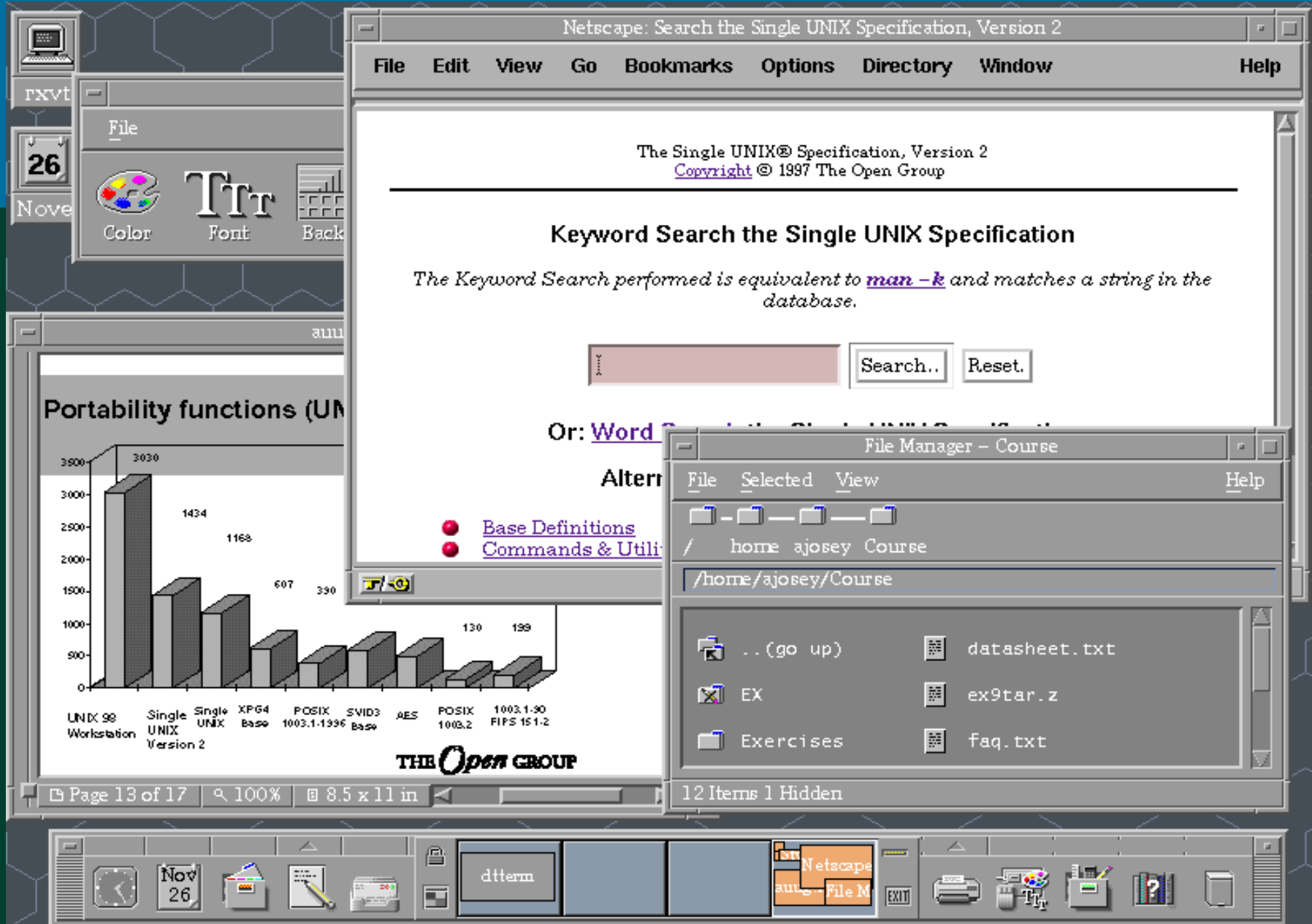
Trade Mark

Technology
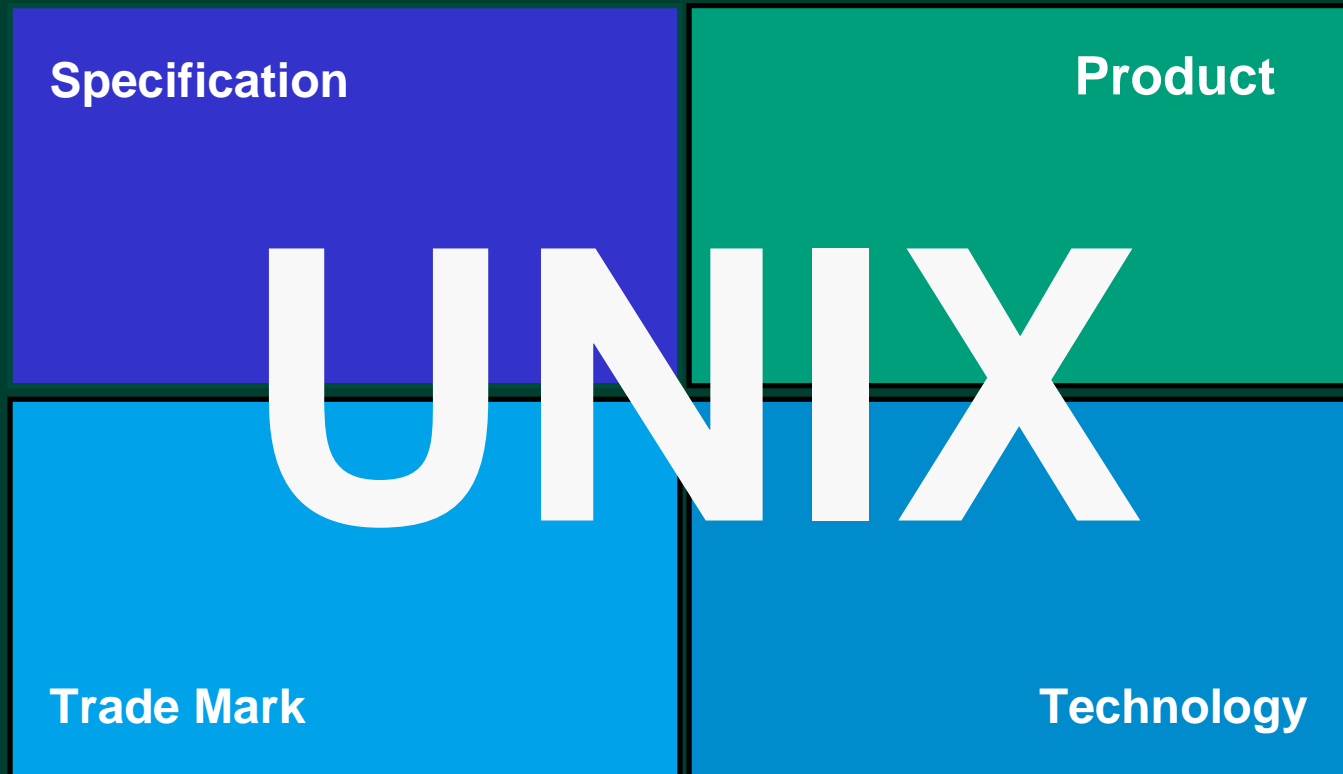
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UNIX® Present

- A Standard Graphical User Interface
  - The Common Desktop Environment
  - Shipped and Supported by all major vendors
- A Standard definition of the core operating environment
  - The Single UNIX Specification
  - Shipped and Supported by all the major vendors
- Security up to and including "Orange Book" B1

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Netscape: Search the Single UNIX Specification, Version 2

File   Edit   View   Go   Bookmarks   Options   Directory   Window   Help

The Single UNIX® Specification, Version 2
Copyright © 1997 The Open Group

Keyword Search the Single UNIX Specification

The Keyword Search performed is equivalent to **man −k** and matches a string in the database.

Search..   Reset.

Or: Word

Altern

Base Definitions
Commands & Utili

rxvt

File

Color   Font   Back

Portability functions (U

Page 13 of 17   100%   8.5 x 11 in

File Manager – Course

File   Selected   View   Help

/   home   ajosey   Course

/home/ajosey/Course

..(go up)   datasheet.txt

EX   ex9tar.z

Exercises   faq.txt

12 Items 1 Hidden

dtterm   Netscape   File M   EXIT

Nov
26

UNIX 95 Products

- Bull ESCALA(TM) & SAGISTER(TM) FAMILIES of symmetric multi-processors and clustered systems & other binary compatible Bull DPX/20 mono-processing systems with AIX(R) Version 4.2.1 or later and C for AIX(R) Version 3 or later & XTI API Version 2
- Digital UNIX® Version 4.0 running Digital's AlphaStations and Digital's AlphaServers
- Hewlett-Packard HP-UX Release 10.20 and later on all HP9000 series 700 and 800
- Hitachi 3050RX,3500/3X,3500/4XX running HI-UX/WE2 Version 06-01 and later
- Hitachi 3500 running HI-UX/WE2 Version 07-01 and later
- IBM Power, Power2 and PowerPC™ Systems with IBM AIX® Version 4.2 or later
- IBM OS/390 Version 1 Release 2 or later with OS/390 V1R2 or later Security Server and OS/390 V1R2 or later C/C++ Compiler on IBM System/390 Processors

- NCR UNIX System V Release 4 MP-RAS Release 3.02 or later on NCR WorldMark Series 3000 Series
- NCR: Solaris 2.6 and on, on NCR WorldMark and "S" Series (x86 based systems)
- NEC UX/4800 R12.3 and later on UP4800 and EWS4800 Series
- SCO UnixWare® Family R2.1.1 and later for single and multiprocessor Intel 386/486 or Pentium® PCs
- SNI Business Servers running BS2000/OSD V3.0 and higher
- SNI Reliant UNIX V5.43 running on RM Server Family, all Models RM200/300/400/600
- Siemens Pyramid Reliant® UNIX 5.43 running on Reliant RM1000® Cluster Server
- Sun Solaris 2.6 on SPARC based systems
- Sun Solaris 2.6 on x86pc based systems

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The Value of Standards

- Driven by the need for commonality and the desire to avoid consumer "lock-in"
- Endorsed by US and European Governments
- Resulted in the industry agreed definitive specification of what constitutes a UNIX system:
  - The Single UNIX Specification (1994)

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The Value of Standards (Cont'd)

- Today, all the major vendors have implemented the Single UNIX Specification

- The UNIX 95 mark is validated using extensive tests that allow objective determination of conformance and backed up by a unique vendor guarantee - *The Open Brand*

- The Open Brand

  - operates under trademark law

  - designates products that are guaranteed to conform to open systems specifications

  - a vendor guarantees that any non compliances will be fixed within a defined time period

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The Single UNIX Specification

- Designed to give software developers a single set of APIs to be supported by every UNIX system
- Shifts the focus from incompatible UNIX system product implementations to compliance to a single set of APIs
- If an OS meets the specification and commonly available applications run on it then it is open.
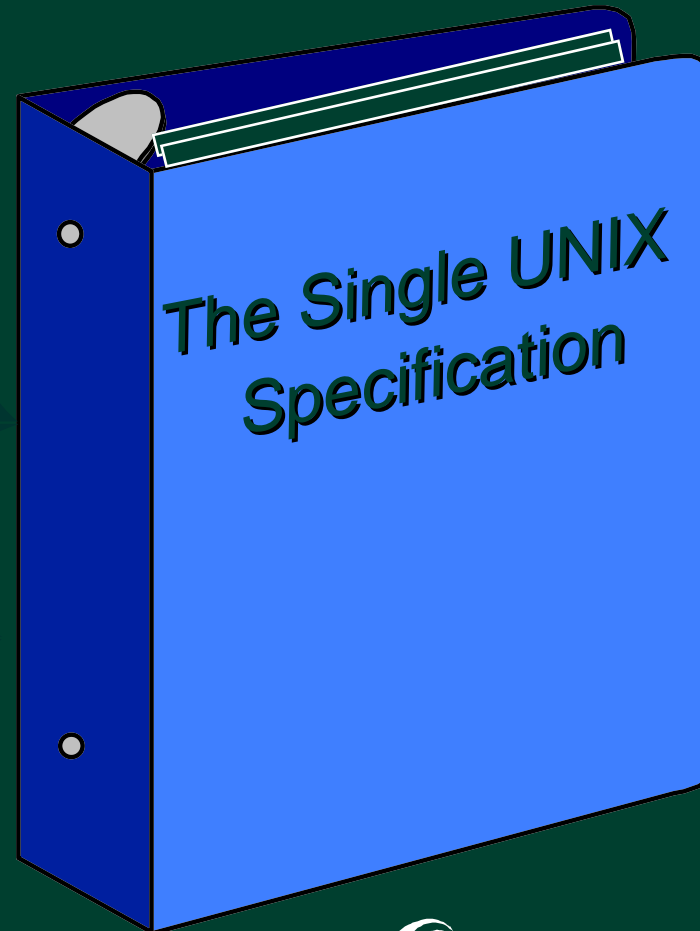
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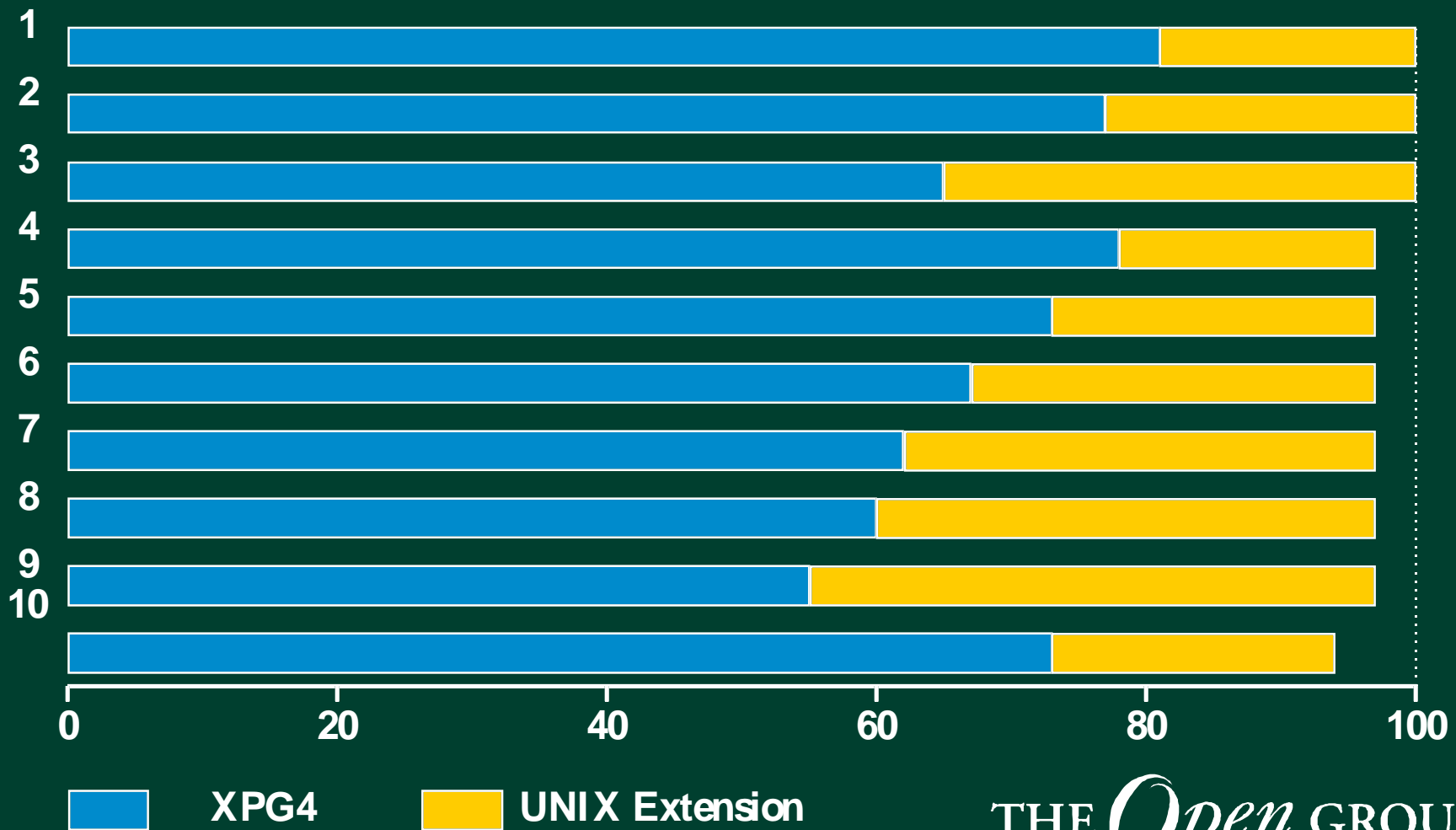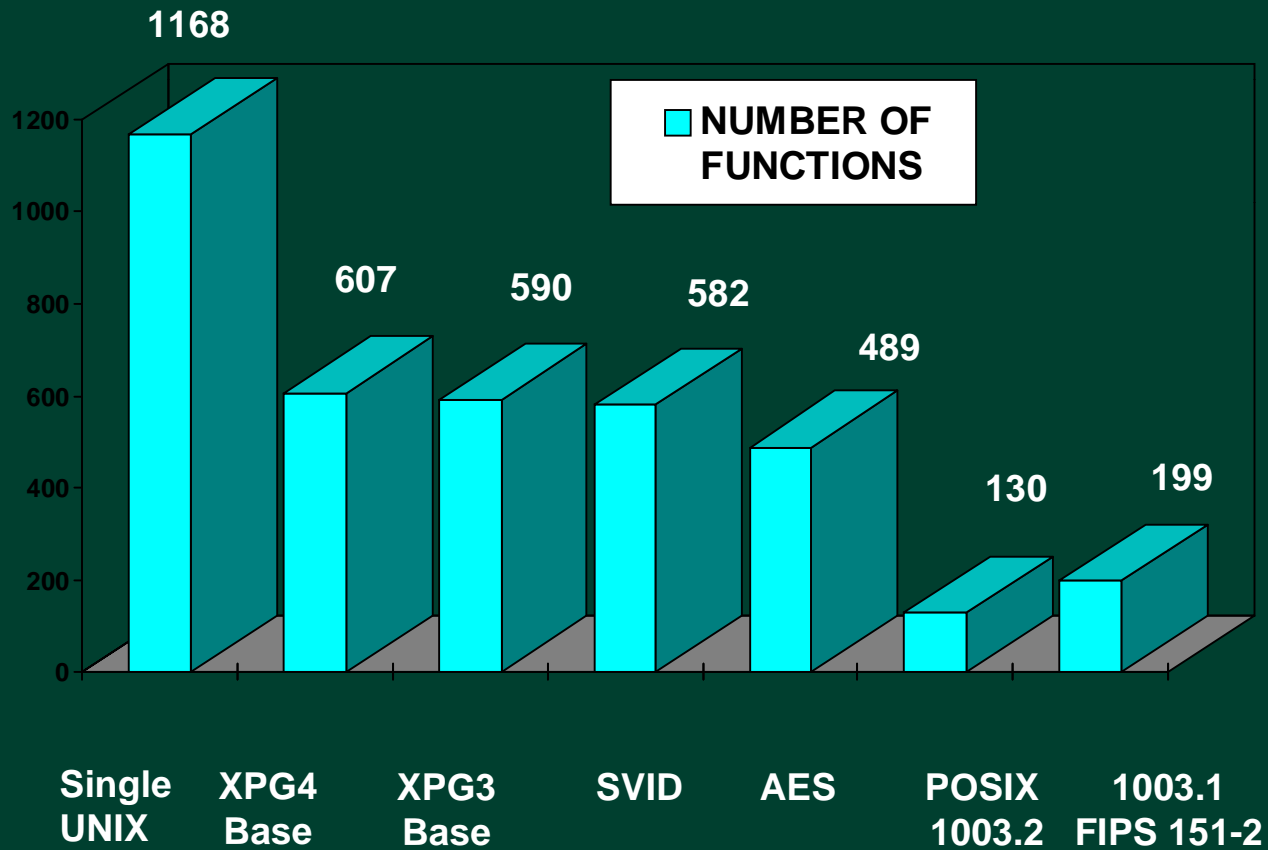# The User Driven Process

50 Popular Applications

The Single UNIX Specification

Formal and Defacto Standards

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Application Coverage by Specification
For Ten Representative Applications
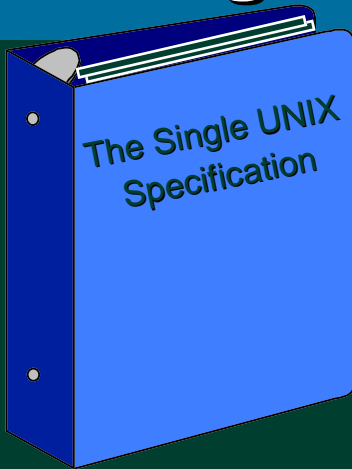
Portability functions (UNIX 95)

SOURCE = Emerging Technologies Group

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The Single UNIX Specification Version 2

The Single UNIX Specification

The Single UNIX Specification Version 2

Formal Standards

Industry Practise

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The Single UNIX® Specification, Version 2
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Keyword Search the Single UNIX Specification

The Keyword Search performed is equivalent to **man −k** *and matches a string in the database.*

[Search..] [Reset.]

Or: Word Search the Single UNIX Specification

Alternatively, Select an Alphabetical, or Section Index:

- Base Definitions
- Commands & Utilities
- System Interfaces
- System Headers
- Networking Services
- X/Open Curses

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UNIX 98 Product Standards

- UNIX 98 - the mark for systems conforming to Version 2 of the Single UNIX Specification
- UNIX 98 - "*the Base*"
- UNIX 98 Workstation
  - UNIX 98 plus CDE
- UNIX 98 Server
  - UNIX 98 plus Internet Server capabilities
  - Adds interoperability services to the UNIX 98 APIs in support of internet/intranet services

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UNIX 98 Base

1003.1c Threads

1003.1b Realtime

ISO C Am. 1

Formal Standards

Aspen Threads

64-bit API

Large File Summit

Dynamic Linking

Y2K

Industry Practise

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UNIX 98 Threads - Benefits

Aspen Threads

1003.1c Threads

- A large benefit to certain classes of applications
  - typically server or parallel processing
- allows significant gains on multiprocessor hardware
- increases application throughput, even on uniprocessor hardware
- efficient within process communication
- Built upon POSIX Threads with extensions

⮫ **http://www.UNIX-systems.org/version2/whatsnew/threadspaper.pdf**

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UNIX 98 LFS and 64-bit

Large File Summit

64-bit API

- The *Single UNIX Specification* has been updated to support large files with unlimited file offsets and 64-bit and larger systems
- Removed 32-bit dependencies
    – becomes a data size-neutral API
- Provides support for new leading-edge applications demanding larger data model and address space

 ⮕ **http://www.UNIX-systems.org/version2/whatsnew/lfs.html**
 ⮕ **http://www.UNIX-systems.org/version2/whatsnew/datasize.html**

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UNIX 98 Realtime

1003.1b Realtime

- Historically UNIX has been a timesharing system
- Todays applications have more stringent performance and robustness requirements
- Require predictable execution characteristics and precise timing.
- A new UNIX Realtime extension introduced based on POSIX 1003.1b.

http://www.UNIX-systems.org/version2/whatsnew/realtime.html
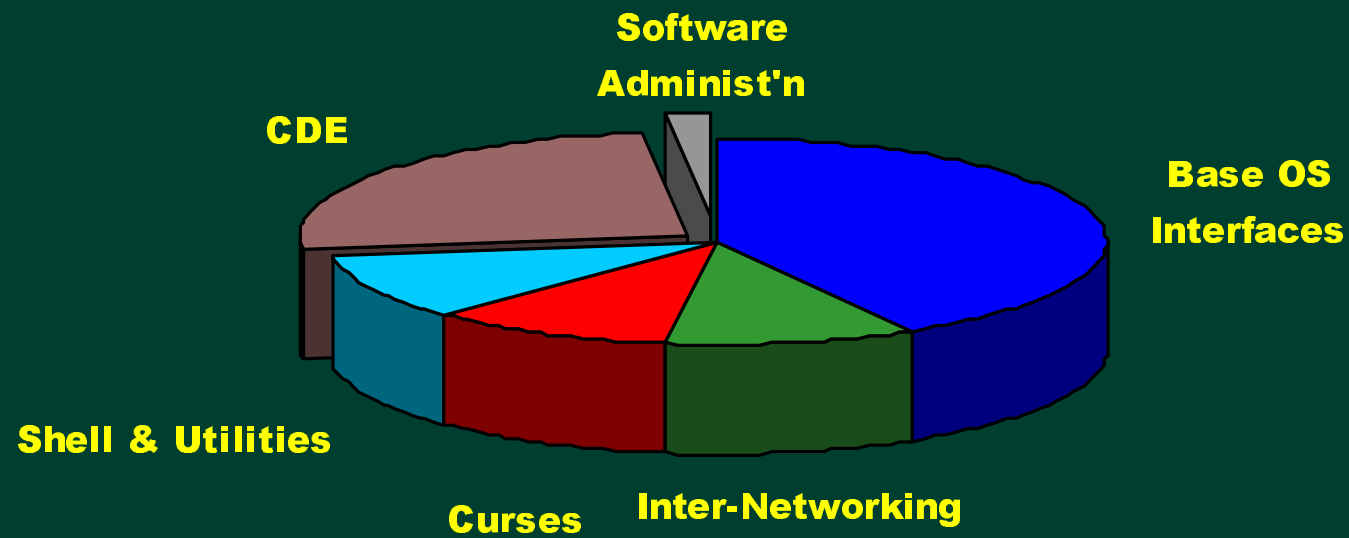
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UNIX 98 and the Year 2000

Y2K

- The *Single UNIX Specification* has been reviewed for Year 2000 alignment
- A white paper has been produced for existing users giving practical advice for users
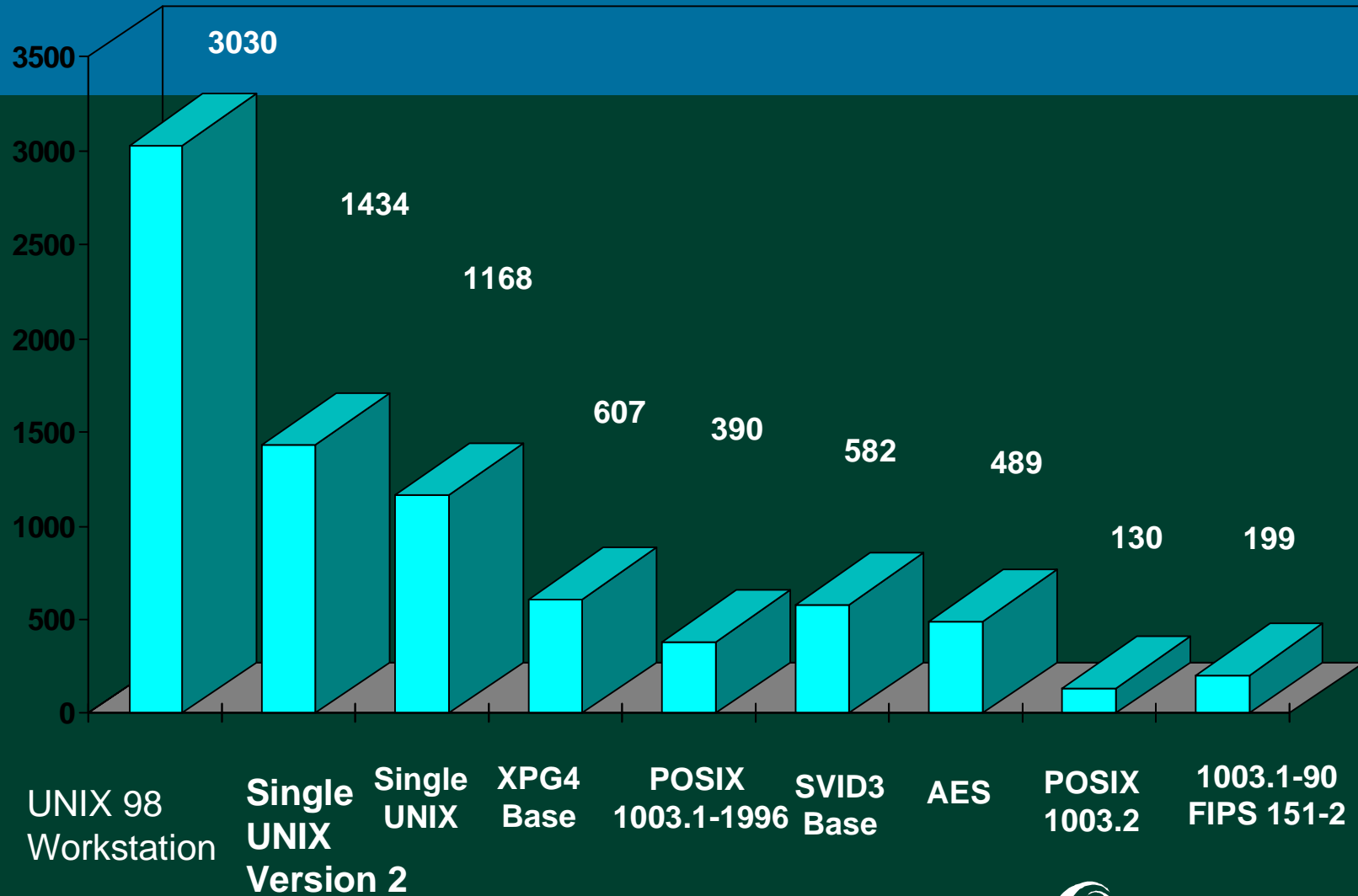
➲ **http://www.UNIX-systems.org/version2/whatsnew/year2000.html**

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UNIX 98 Workstation

Software Administ'n

CDE

Base OS Interfaces

Shell & Utilities

Curses   Inter-Networking

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Portability functions (UNIX 98)

UNIX 98 Server

- Additional functionality over existing UNIX 98 Product standard includes:
    - The Internet Protocol Suite
    - Java Support
    - Internet capabilities to support network computing

Java is a trademark of Sun Microsystems Inc.

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UNIX System Strengths

- UNIX systems retain high-end system strengths
  - Stability and reliability
  - Scalability
  - High throughput
  - Database engine
  - Internet support

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Stable, Reliable and Mature

- Stable, Reliable and Mature
  - Safe, not risky
  - 25-year heritage of end-user development and use
  - Strong growth market
    - $122 billion installed base
    - 150 countries
  - $39 billion market currently, growing to $50 billion in year 2000

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Mission Critical

- Proven Mission-Critical Capabilities
  - Widely deployed across industries and applications
  - 82% of all Internet servers
  - Majority of all scaleable enterprise databases, on-line transaction processing systems, and enterprise client/server applications
  - 24x7x52

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Open

- Open
  - "Guaranteed Open" — The Open Group
  - Freedom of Choice
  - Consistent GUI — Common Desktop Environment (CDE)
  - Access to applications and data across multi-vendor platforms

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The UNIX® System and Microsoft® Windows NT®

- Key differences
  - The UNIX system today is more robust, reliable and scalable.
  - UNIX is based on open standards
  - Unit shipment *growth rates* for Windows NT exceed the rates for the UNIX system
  - Windows NT Server 4.0 is not a fully functional server operating system

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Key IT Trends

- The emergence of Network computing
- Knowledge Management
- Digital media replacing physical objects

UNIX is the optimal platform to take advantage of the latest IT trends

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UNIX Systems - The Future

The leading operating system for mission- and business-critical computing applications, the open UNIX system environment provides unmatched maturity, throughput, reliability, stability and scalability, supported by multiple vendors.

Unlike other operating system environments, the customizable UNIX system can network the legacy past with the heterogeneous enterprise present and is flexible and robust enough to handle whatever the future brings.

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Further Information

- **World Wide Web**
  - *http://www.UNIX-systems.org*
  - *http://www.UNIX-systems.org/version2/*
- *Go Solo 2 - The Authorized Guide to Version 2 of the Single UNIX Specification*
  - **600 pages**
  - **CD-ROM with the full 3000 page Specification in HTML and PDF.**
  - *http://www.UNIX-systems.org/gosolo2/*
- **The Online Single UNIX Specification**
  - *http://www.UNIX-systems.org/go/unix*

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