

資訊系統原理

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UNIX

- ✍ Introduction
- ✍ Programmer Interface
- ✍ User Interface
- ✍ Process Management
- ✍ Memory Management
- ✍ File System
- ✍ I/O System
- ✍ Interprocess Communication

* "Operating system concept", Silberschatz and Galvin, Addison Wesley, pp. 647-693.

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UNIX

- ✍ Created by Ken Thompson & Dennis Ritchie at Bell Laboratories in 1969 & on PDP-7.
 - ✍ ACM Turing award winners for the design of UNIX in 1983.
 - ✍ C programming language inventor: Dennis Ritchie.
- ✍ Major Contributors:
 - ✍ Bell Laboratories, Computer Systems Research Group (CSRG) of the University of California at Berkley (released in BSD), UNIX System Laboratories (USG/USDL/ATTIS/DSG/USO/USL), etc.

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UNIX

✍ Influence

- ✍ fork() from Berkley's GINIE, 4.2 BSD file-mapping virtual memory interface from TENEX/TOPS-20, 4.4BSD virtual memory interface from MACH. fcntl system call from System V. Disk quotas and 4.3 BSD time-zone-handling package from the user community.
- ✍ 4BSD job control, reliable signals, multiple file-access permission groups, and file system interface were adopted by AT&T UNIX System V, IEEE POSIX.1 standard, etc. 4BSD socket ported to AT&T System III. 4BSD implementation of TCP/IP networking protocol suite widely adopted!

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UNIX - Design Goals

✍ 4.2BSD - 1983

- ✍ DARPA (Defense Advanced Research Projects Agency) wanted a standard research operating systems for the VAX.
- ✍ Networking support - remote login, file transfer (ftp), etc. Support for a wide range of hardware devices, e.g., 10Mbps Ethernet.
- ✍ Higher-speed file system.
- ✍ Revised virtual memory to support processes with large sparse address space (not part of the release).
- ✍ Inter-process-communication facilities.

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UNIX - Design Goals

✍ 4.3 BSD - 1986

✍ Improvement of 4.2 BSD

- ✍ Loss of performance because of many new facilities in 4.2 BSD.
- ✍ Bug fixing, e.g., TCP/IP implementation.
- ✍ New facilities such as TCP/IP subnet and routing support.

✍ Backward compatibility with 4.2 BSD.

✍ Second Version - 4.3 BSD Tahoe

- ✍ support machines beside VAX

✍ Third Version - 4.3 BSD Reno

- ✍ freely redistributable implementation of NFS, etc.

UNIX - Design Goals

✍ 4.4 BSD - 1993

✍ POSIX compatibility

✍ Deficiencies remedy of 4.3 BSD

- ✍ Support for numerous architectures such as 68K, SPARC, MIPS, PC.
- ✍ new virtual memory better for large memory and less dependent on VAX architecture.
- ✍ TCP/IP performance improvement and implementation of new network protocols.
- ✍ Support of an object-oriented interface for numerous filesystem types, e.g., SUN NFS.

UNIX - Major UCB CSRG Distributions

- ✍ Major new facilities:
 - ✍ 3BSD, 4.0BSD, 4.2BSD, 4.4 BSD
- ✍ Bug fixes and efficiency improvement:
 - ✍ 4.1 BSD, 4.3BSD

UNIX

- ✍ Distinguishing Features
 - ✍ Written nearly completely in a high-level language, i.e., C.
 - ✍ High portability!
 - ✍ Distributed in source form.
 - ✍ Contributions from everywhere!
 - ✍ Provide powerful primitives and functions such as concurrent processes.

Design Principles

- ✍ Simple Algorithms for Implementation
- ✍ Replaceable Standard User Interface
 - ✍ Shell
- ✍ Time-Sharing
 - ✍ Simple Priority-Driven CPU Scheduling
- ✍ Demand-Paging Virtual Memory (4.3BSD)
 - ✍ Swapping
- ✍ Similar treatments of disk files and I/O devices