History of Solaris

Bill Joy Discovers Unix

- In 1975, Ken Thompson visited Berkeley while on sabbatical, and installed version 6 on a PDP-11/70.
- It was at this time that two graduate students, Bill Joy and Chuck Haley, got involved with version 6 and later played an important role in the development of the UNIX system at Berkeley.
  - The first project they worked on was the development of the UNIX ex editor.

- Joy and Haley began to take interest in the internal operations of UNIX—specifically, the kernel
- Joy put together a distribution of UNIX called the Berkeley Software Distribution (BSD)
- He included enhancements such as the C shell (a C-like interface to UNIX) and the vi editor
- 1BSD was released in 1975
- By the second release of BSD in 1978, Joy had added virtual memory support, which allowed programs to run even if they required more physical memory than was available at the time

- In the early 1980s, Joy left Berkeley with a master's degree in electrical engineering, and became cofounder of Sun Microsystems (Sun stands for Stanford University Network)
- Sun's implementation of BSD was called SunOS
- Sun extended the networking tools of the operating system to include the Networked File System (NFS), which was to become an industry standard
- Sun also did some of the early work in developing windowing software for UNIX. SunOS was first released in 1983

1993

- Sun announced that SunOS, release 4.1.4, would be its last release of an operating system based on BSD.
  - Sun saw the writing on the wall and moved to System V, release 4, which they named Solaris.
- SRV4 was a merger of System V and BSD, along with important features found in SunOS
- As more hardware vendors, such as Sun, began to enter the picture, a proliferation of UNIX versions emerged.
- Because UNIX was a trademark, hardware vendors had to give their operating systems a unique name.

- The Graphical User Interface (GUI) was the next wave in the development of the UNIX operating system.
- Applications that were to be portable needed a GUI standard.
- Sun and AT&T started promoting OPEN LOOK, which they jointly developed.
- Their goal was to create a consistent look and feel for all flavors of UNIX; unfortunately, OSF had its own GUI called OSF/MOTIF.
- Thus, round two of the fight for standards began, with MOTIF beating out OPEN LOOK.

- MOTIF was based on a GUI developed at MIT named the X Window System, which allowed a user sitting at one machine to run programs on a remote machine while interacting with the program locally
- X allowed a program run on one computer to display its output on another computer, even when the other computer was of a different operating system and hardware architecture
- The program displayed its output on the local machine, and accepted keyboard and mouse input from the local machine, but it executed on the CPU of the remote machine

- X was a distributed, intelligent, device-independent, operating-system-independent windowing system.
- When MOTIF beat OPEN LOOK in the standards war, Sun conceded, and started to provide a package that contained both OPEN LOOK and MOTIF—called the Common Desktop Environment (CDE) —as standard equipment beginning with Solaris 2.5.1

SOLARIS MILESTONES

- 1982 - AT&T first markets UNIX. Sun Microsystems is founded
- 1983 - Sun Microsystems introduces SunOS
- 1988 - AT&T and Sun start work on SVR4, a unified version of UNIX
- 1992 - Sun introduces Solaris, which is based on System V, release 4. SunOS, which is based on BSDF UNIX, will be phased out
- 1994 Solaris 2.4 is available
- 1995 Solaris 2.5 is available

- 1997 Solaris 2.6 is available
- 1998 Solaris 7 is available
- 2000 Solaris 8 is available
- 2001 Solaris 9 in Beta testing Q3
- 2002 Jan. 8 Sun announces that Solaris 9 will not support x86 platform
- 2002 Solaris 9 for Sparc released mid Q2

Milestones in Sun's History

- Sun is incorporated in February 1982, with four employees
- First workstation introduced. It includes TCP/IP, now known as the Internet protocol suite.
- 1983: Sun and Computervision sign a $40 million OEM agreement.
- 1984: NFS technology introduced and licensed free to the industry. It's destined to become the industry standard for network file sharing.

- Sun has a wildly successful initial public stock offering
- 1987: Sun and AT&T lay the groundwork for business computing in the next decade with an alliance to develop Unix System V Release 4
- 1988: Sun reaches $1 billion in revenue--the fastest rise ever for a computer company with a direct sales force

- 1989: SPARCstation 1 system introduced
  - Features are so tightly integrated it fits in a 3- by 16- by 16-inch enclosure--the first "pizza box."
- Sun's expanded alliances with Informix, Ingres, Oracle, and Sybase set the stage for our emergence as the number one database platform
- 1990: Sun follows up the SPARCstation 1 with four new models--including the first workstation for under $5,000

- 1991: Sun's market share in RISC--the world's fastest, most powerful computing architecture--hits 63 percent
- More than half a million systems shipped to date
- Sun unveils Solaris 2 operating environment, specially tuned for symmetric multiprocessing
- 1992: Sun introduces the SPARCstation 10 system, the first multiprocessing desktop computer
- Sun's name appears on Standard & Poor's 500

- Sun ships more multiprocessing UNIX servers in a single year than any other vendor shipped in its history
- 1993: In just over 10 years, Sun reaches an incredible milestone--one million systems shipped
- Sun makes its debut on the Fortune 500
- 1995: Sun introduces Java, the first universal software platform, designed from the ground up for the Internet and corporate intranets. Java technology enables developers to write applications once to run on any computer.

- Sun and third-party associates reach another milestone--10,000 application solutions on the SPARC/Solaris platform
- SunSolve Online provides technical support via the Internet.
- 1996: Sun UltraTM workstation family introduced
  - Features the 64-bit UltraSPARC processor with on-chip multimedia, graphics, and imaging technologies.
- Sun licenses Java technology to all major hardware and software companies.

- Web-enhanced Solaris environment introduced. With more than 100 enhancements, this release substantially increases the software's Internet performance.
- Sun StorEdge A5000 system introduced. It is the industry's only second-generation fibre-channel disk array.
- Sun becomes the number one supplier of UNIX multiuser disk subsystems.

- 1998: Solaris 7 operating environment raises the bar for network software. Advanced 64-bit technology delivers dramatic increases in performance, capacity, and scalability.
- 1999: Netra t1 servers make their debut -- designed for service providers, by service providers.
- Sun makes StarOffice productivity suite available to all, free of charge.
- Sun Ray 1 enterprise appliances with Hot Desk technology provide an ideal solution for enterprise workgroups.

- 2000: Solaris 8 Operating Environment introduced
- 2001: Sun's UltraSPARC III processor debuts in Sun Blade 1000 workstations and Sun Fire 280R workgroup servers

Solaris 2.5

- Components:
  - SunOS 5.5
  - OpenWindows 3.5
  - CDE 1.0
  - Wabi 2.1
- Releases:
  - Initial Release: November 1995
  - Hardware Release: January 1996
    - Added support for Creator3D graphics cards
- Supported Hardware Platforms:
  - SPARC: sun4c, sun4m, sun4d, sun4u
  - Intel x86 (up to & including Pentium Pro)
  - PowerPC
- Newly supported hardware:
  - Ultra 1

- Changes from Solaris 2.4:
  - NFS Version 3 server & client
  - NFS over TCP server & client
  - UFS Access Control Lists (ACLs) - extended file access permissions per POSIX.6
  - CDE (Common Desktop Environment) added
  - POSIX.1c thread libraries

Solaris 2.5.1

- Components:
  - SunOS 5.5.1
  - OpenWindows 3.5
  - CDE 1.0.2
  - Wabi 2.2
- Server Bundle additionally includes:
  - Solstice AdminSuite 2.2
  - Solstice Backup 4.2
- Releases:
  - Initial Release: May 1996
  - Internet Server Supplement: October 1996
    - Improved TCP/IP performance by moving socket code into the kernel and tuning TCP/IP retransmission algorithms. Added WebNFS, Java Virtual Machine, and DHCP server.
  - Hardware Update: February 1997
    - Added Support for Ultra Enterprise 10000 (Starfire) and SPARCengine Ultra AX motherboards

- Supported Hardware Platforms:
  - SPARC: sun4c, sun4m, sun4d, sun4u
  - Intel 486, Pentium, and Pentium Pro
  - PowerPC
- Newly supported hardware:
  - Ultra 2
  - Ultra Enterprise servers
  - Ultra ZX & FFB+ graphics cards
  - PowerPC
- Changes from Solaris 2.5:
  - User ID's (uid_t) increased to 32 bits
  - Added 64-bit Kernel Asynchronous AIO (aioread64/aiowrite64)
  - Expanded maximum virtual memory size to 3.75 gigabytes.
  - x86 version optimized for Pentium & Pentium Pro processors.

Solaris 2.6

- Components:
  - SunOS 5.6
  - OpenWindows 3.6
  - CDE 1.2
- Releases:
  - Beta Release: Dec. 1996
  - Initial Release: August 18, 1997
  - SunSolve Release Name: s297
- Supported Hardware Platforms:
  - SPARC: sun4c, sun4m, sun4d, sun4u
  - Intel 486, Pentium, Pentium Pro
- Newly supported hardware:
  - SCSI-3 devices

- Old hardware no longer supported:
  - Intel 386 PC's (not Sun 386i's - those are not supported by any Solaris release)
  - SPARCserver 630MP, 670MP, 690MP
  - PowerPC
  - Printers using the NeWSprint software
  - GS & GT graphics devices
  - SBus Expansion Subsystem

- Changes from Solaris 2.5.1:
  - New printing software including support for distributing printer config data via NIS or NIS+
  - WebPrint - web based printer administration & Windows NT connectivity
  - Power Management integrated into OS, x86 support added
  - File synchronization for mobile machines ("like the Win95 Briefcase")

- Added support for removable-media SCSI devices other than cdroms (Zip drives, syquest cartridges, etc.)
- The Answerbook viewer added Web browser functionality to support a new SGML format of Answerbook
- Java Virtual Machine 1.1.2 (with native threads) and HotJava WWW browser included
- DHCP server & client software
- CDE 1.2 - integrated into OS CD, dtlogin is the default on console instead of command-line login
- TrueType font support
- NFS clients better able to deal with server failures through client failover and cachefs enhancements to allow use of cached data when server is down

- BIND DNS client/server upgraded to 4.9.5
- 64-bit file system interfaces (individual files > 2 gigs) based on the API agreed upon at the Large File Summit, and included in the Single UNIX Specification, Version 2 (UNIX 98) standard
- Single UNIX Specification Version 1 (aka SPEC 1170) Compliance - UNIX 95 branding; partial, but not full Single UNIX Specification, Version 2 (UNIX 98) compliance
- libw & libintl merged into libc, along with basename, dirname, regcmp, and regex calls from libgen

- snprintf/vsnprintf added - currently as defined by BSD 4.4/GNU libc, future versions will comply with the UNIX 98 specification and the ISO C9x revised standard currently under development
- POSIX standards support added: 1003.1b real-time support, POSIX Async I/O, POSIX.4 message passing
- Pluggable Authentication Model (PAM) - per-application configurable authentication choices

- Kerberos 5 client & server support
- GSS-API (Generic Security Service Application Program Interface, RFC's 1508 & 1509) - allows for RSA & Kerberos 5 functionality in RPC
- doors API available to the public, as well as used more places in the system (such as a new RPC transport which is supposed to show big performance increase over using the loopback interface)
- keyserv is multithreaded and uses the new doors RPC transport

- new PCMCIA Card Services interfaces added to DDI, booting from PCMCIA devices supported
- x86: new booting system supports EISA & Plug-and-Play devices, driver installation can be done by just inserting floppy with new driver ("just like Win95"), binary compatibility with SCO Unix device names persistent across reconfiguration boots
- X/Open Federated Naming (XFN) 2.0
- network clock synchronization via NTP (the Network Time Protocol, RFC 1305)

- General speedups in a variety of areas, including optimization improvements from upgrading to the SPARCompilers version 4.2 (better register allocation & branch prediction algorithms)
- Logging UFS pulled from Solstice DiskSuite 4.1 and integrated into main OS
- Variable Length Subnet Masking (VLSM) support added
- Virtual Memory enhancements: 4 gig total address space, page sizes > 4kb
- MP enhancements: ability to bind a process to a set of processors instead of just a single processor

- MT enhancements: user-level mutexes smarter (if waiting for a sleeping thread then just block - but if waiting for a live thread, go ahead and keep trying for a little bit)
- TCP/IP enhancements: Zero-copy hardware checksums on ATM, large windows, Maximum size of listen queue raised from 1024
- SCSI drivers (esp, isp, fas) now allow setting options at per-device level
- "Direct I/O" - halfway between UFS & raw partitions for databases
- Year 2000 Compliance: bug fixes for several utilities, all parts of O/S tested with date set past 2000

Solaris 7

- Components:
  - SunOS 5.7
  - OpenWindows 3.6.1
  - CDE 1.3
- Released:
  - Solaris 7 Final Release: October 27, 1998
    - The name was changed from 2.7 to Solaris 7 shortly before release for marketing reasons
- Old hardware no longer supported:
  - x86 Micro Channel Bus Architecture [see Solaris 2.6 Release Notes]
  - Graphics devices: MG1/MG2 (bwtwo), CG2, CG4, TC (cg8), ZX/TZX (leo) [see Solaris 2.6 Release Notes]

- Changes from Solaris 2.6:
  - The "2." was dropped from the version name
    - Sun had no plans for changes so major and incompatible to justify a Solaris 3.0 release, and was running out of unambigous 2.x numbers (2.10 can be read as either "two point ten" or "two point one zero", one of which implies an upgrade from 2.9, the other does not).
    - Sun marketing was rumored to want to point out Solaris 7 > NT 5, but Microsoft renamed NT 5 to Windows 2000 the next week
  - UFS filesystem upgraded to support logging without requiring DiskSuite

- 64-bit memory addressing (on UltraSparc's only)
- man pages converted from nroff to sgml format (see Solaris 2.6 Release Notes)
- Several new commands added:
  - pgrep/pkill process management command
  - Info-ZIP unzip
  - traceroute
- Solaris Desktop Extensions merged into CDE 1.3

Solaris 8

- Components:
  - SunOS 5.8
  - OpenWindows 3.6.2
  - CDE 1.4
- Releases:
  - Final Release: Q1 2000
- Old Hardware no longer supported:
  - sparc: sun4c (Sparc 1/2/IPC/IPX/etc.) & Voyager machines
  - x86: Various ISA & EISA bus cards

- Changes from Solaris 7:
  - Early Access program open to the public - for $30 anyone can get a sneak peak at what Solaris 8 will bring.
  - Perl 5, Apache, and otber freeware tools bundled
  - Live Upgrade: Install new OS versions while computer still running old versions. Downtime reduced to the time it takes to reboot.
  - Role Based Access Control: allows assigning functions traditionally restricted to root to non-root users.
  - IPv6

- JDK 1.2.1 & 1.1.8 both provided, faster Java VM's
- StarOffice bundled
- Netscape 4.7 integrated (/usr/dt/bin/netscape)
- DVD, USB, & IEEE 1394 support
- LDAP support in nsswitch.conf
- Web-Based Enterprise Management (WBEM)

Solaris Version History

SunOS version	Solaris version	Release date
4.1.1	none	Mar. 90
4.1.1B	1.0	Feb. 91
4.1.2	1.0.1	Dec. 91
4.1.3	1.1A	Aug. 92
4.1.3_U1	1.1.1	Dec. 93
4.1.4	1.1.2	Nov. 94
5.0	2.0	Jul. 92
5.1	2.1	Dec. 92
5.2	2.2	May 93
5.3	2.3	Nov. 93
5.4	2.4	Aug. 94
5.5	2.5	Nov. 95
5.5.1	2.5.1	May 96
5.6	2.6	Aug. 97
5.7	7	Oct. 98
5.8	8	Jan. 2000
5.9	9	May 2002