

# *INDEX*

1. SOLARIS FEATURES
2. DIFFERENCE BETWEEN WINDOWS  
AND MACINTOSH
3. MAC OS X LEOPARD VS MICROSOFT  
WINDOWS VISTA
4. SUN MICROSYSTEM
5. NEW FEATURES OF THE FUTURE  
WINDOWS MEDIA PLAYER 12

## *SOLARIS FEATURES:*

### **Feature Overview**

Get more details on the award winning and industry leading features in Solaris 10. Find out how these [award winning features](#), Solaris Containers, ZFS, DTrace, and more can generate efficiencies and savings in your environment.

---

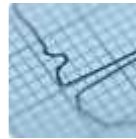
#### **Security**

Solaris 10 includes some of the world's most advanced security features, such as Process and User Rights Management, Trusted Extensions for Mandatory Access Control, the Cryptographic Framework and Secure By Default Networking that allow you to safely deliver new solutions, consolidate with security and protect mission-critical data.



#### **Observability**

The Solaris 10 release gives you observability into your system with tools such as Solaris Dynamic Tracing (DTrace), which enables real-time application debugging and optimization.



---

#### **Performance**

Solaris 10 delivers indisputable performance advantages for database, Web, and Java technology-based services, as well as massive scalability, shattering world records by



---

#### **Platform Choice**

Solaris 10 is fully supported on more than 1200 SPARC-based and x64/x86-based systems from top manufacturers, including systems



delivering unbeatable price/performance advantages.

from Sun, Dell, HP, and IBM.

---

### **Networking**

With its optimized network stack and support for today's advanced network computing protocols, Solaris 10 delivers high-performance networking to most applications without modification.



---

### **Virtualization**

The Solaris 10 OS includes industry-first virtualization features such as Solaris Containers, which let you consolidate, isolate, and protect thousands of applications on a single server.



---

### **Data Management**

Solaris 10 offers dramatic advances in file system and volume management by delivering virtually unlimited capacity and near-zero administration.



---

### **Availability**

New Solaris 10 features, such as Predictive Self Healing, support automatic diagnosis and recovery from hardware and application faults, maximizing system uptime.





### **Interoperability**

Understanding that businesses today rely on a mix of technologies from a variety of vendors, Solaris 10 provides tools to enable seamless interoperability with hundreds of heterogeneous hardware and software platforms.



### **Support & Services**

Offering a broad portfolio of world-class services, Sun can help you extract maximum value from the Solaris 10 Operating System.

### *Difference between Windows and Macintosh*

Which operating system do you use for your computer? If it is either Windows or Macintosh, wouldn't you like to understand the difference between them? If you would, you must read on...

I am sure you know what Mac and Windows are! Yes, they are two competing **operating systems** (OS or O/S) in use today. Both of them have amassed popularity for different reasons. Both of these operating systems have a following of their own. Before understanding the differences between Windows and Mac, let us take a quick look at each of them.

### **Microsoft Windows**

It is a software operating system and graphical user interface that was developed by Microsoft. Following its introduction in 1985, it became immensely popular among the personal computer users. Its development had begun on two parallel

routes. The development on one route was intended for personal use while the other was for professional use. The versions aimed at personal use featured greater multimedia support and lacked [networking](#) capabilities. The professional versions of Windows offered greater networking and security features but lacked multimedia support. [Windows XP](#) was a huge success and the relatively recent [Windows Vista](#) is nonetheless popular.

## **Macintosh**

Also known as Mac, Macintosh refers to a brand name that covers a series of personal computers developed by [Apple Inc.](#) Apple produces Mac hardware and has its own operating system that comes packaged with all the Macs. The Mac Operating System can be divided into two families of operating systems. One is the 'Classic' Mac OS, which was shipped with Macs until the creation of Mac OS 9. The second family is Mac OS X, which derives its features from Mac OS 9. The operating system that is currently in use is known as Mac OS X, successor of Mac OS, which is a line of graphical user interface-based operating systems.

Now that you have been introduced to the two operating systems, let us look at the differences between them.

## **Difference between Windows and Macintosh**

The Windows operating system is based on the DOS programming language while Mac is based on Unix.

Windows is universally used while Macintosh is used only on Apple's hardware. As Windows is used by a majority of computer users, it is more vulnerable to being hacked. Macintosh is considered as a more secure operating system.

Windows is criticized for having less number of features as compared to Mac. Moreover, it is less responsive to higher amounts of computing operations. On the contrary, Macintosh boasts of a rich feature set and ease of use.

While Windows focuses on office function, Macintosh is focused on graphics and multimedia functions. Mac is considered suitable for entertainment purposes, whereas Windows is best suited for business use. Mac is popularly used for photo editing and for playing videos and music.

Similar functions that are executable on both Macintosh and Windows differ in their terminology. For example, the function of the Control key in Windows corresponds to that of the Command key on Macs. The Command prompt on Windows is known as the Terminal on Mac. The Windows control panel corresponds to System Preferences on Mac. Macintosh and Windows differ in file navigation and management, keyboard shortcuts and certain other computer operations. Also, window controls, menu bars and mouse buttons differ in their functionality in both the operating systems.

Thus, we see that Windows and Macintosh are fairly dissimilar operating systems. Each of them comes packaged with a set of advantages and disadvantages and each of them is meant for a distinct section of users. And that makes me want to ask you, to which section of users do you belong?

### *Mac OS X Leopard vs Microsoft Windows Vista*

There are a few Mac fanatics who aren't very impressed with what's coming in Leopard – much like

Windows fanatics (and former Windows fanatics) weren't impressed with Vista. Each camp argues that these OS revisions don't go far enough – the argument is universal.

However, I can tell you that – with my limited exposure to the latest Leopard beta – OS X 10.5 is a far more user friendly, home network happy, 64-bit operating system for consumers than Windows Vista (even with SP1) could ever hope to be. This isn't a classic "Apple vs Microsoft" argument so much as it's a "Windows vs Users" one.

1. I was amazed to discover that VNC functionality was baked into the Finder – no muss, no fuss. I've been using VNC for years, largely because it's a cross-platform service that's simple to set up, access, and (ultimately) use. Leopard doesn't bury the ability to share screens. I simply can't believe it's this simple.
2. Time Machine is backup the way data backup and restoration should be – to a home network, with the right equipment attached. It's beyond comparison. You shouldn't need to hire a geek or network admin to get it to work, it's not buried, and you don't need to install any third-party software (arguments which throw out any kind of "Windows can do the same thing" argument). In this case, it's not the actual feature – it's the finish that's ultimately important.
3. Spotlight indexes and searches, with a fair amount of elegance and invisibility, across open machines connected on the network. Windows Desktop Search, last I tried, makes local searching (alone) a pain in the ass. Moreover, I find Spotlight to be a better implementation of Vista's Start menu – but that may be a personal preference.
4. Packages and preferences are far easier to manage than Windows programs and klutzy installation routines.

- There's a great comment thread on Coding Horror about [this very problem](#). Windows is starting to show its age, and it's going to have to make major backwards software compatibility sacrifices if it intends on surviving as a desktop OS for much longer.
5. To my surprise, the Dictionary now has a direct gateway to Wikipedia. While I don't find Wikipedia to be the ultimate source for information, I do value its community-driven structure. With true identity tied into page edits, it could quickly become the Hitchhiker's Guide to the Galaxy. Contrast this to... well, I guess Windows Vista doesn't have a built-in equivalent to crowdsourced information. I just thought that was an amazing "little touch" that would come in handy at some point (especially after seeing that if Spotlight doesn't have results for a keyword search, it'll spit back a dictionary definition if available for the term).
  6. I appreciate how Apple has handled platform transitions. PowerPC to Intel, 32-bit to 64-bit – there have been a few hiccups along the way, but I'd say that it's been a much better experience for Mac users than it has for those of us in the Windows world. Certainly, progress can be painful – but how painful should it be for you? Apple can change the rules at any given moment, and the onus is on the dev to make sure compatibility exists (or doesn't, for whatever reason). The user doesn't necessarily, and shouldn't have to, break a sweat.
  7. Personal information management is far more seamless on OS X than it is in Windows. Fundamentally, iCal and Vista's Windows Calendar do the SAME thing – but iCal's "To Do" list is linked with Apple Mail. Moreover, .Mac provides a simple gateway for calendar publishing. Apple Mail handles RSS feeds well enough (like Windows Live Mail – which is a



- different, better client than Windows Mail that doesn't ship with Vista). Moreover, Apple's Mail supports Exchange – if only in a limited capacity. I certainly hope the next version of Entourage doesn't vista itself out of usability.
8. Help isn't just documentation, it's largely directional. I needed to find where to change the network Workgroup for my system. I typed "workgroup" in the System Preferences search box – and OS X macro'ed its way to the proper Preference Pane, tab, and precise field where I could change the setting directly. OMG! The Windows Help system, in stark contrast, feels like an "RTFM" experience (mildly ironic, though far from suprising).
  9. Expose is a far better task switcher than the laughable Flip 3D. Expose isn't new in Leopard, but Apple has extended desktop usability by adding Spaces. While virtual desktop software has been available for years, Spaces is quite intuitive and clean. It's no Beryl / Compiz Fusion, but it's certainly better than giving the user nothing OOTB. It's all about encouraging users to get out of the "I can only have one program open at a time" mindset.
  10. Despite some Mac advocates discussing "the Coming Leopard Letdown," it's not quite like "the Existing Vista Letdown." Consider comments made by hmurchison:

Networking – the Finder doesn't choke when volumes are unmounted. The finder doesn't seem to choke when a lot of small files are copied.

Calendar – Not only are Data Dectors back but they're infused nicely in mail and iCal data can now be written

to from 3rd party apps. To Dos are accessible from 3rd parties. If you're a Productivity hound this is Heaven.

UI – The GPU now has a dedicated thread for rendering UI. Resolution Independence is included. OpenGL 2.1 is there with enhanced shading support.

The whole OS is Unix 03 compliant and undergoing certification. The Help menu is vastly better the whole OS is 64-bit yet still runs 32-bit apps natively. QuickTime 32-bit has been deprecated for QTkit 64-bit. QuickTime encodes faster and has alpha support.

I simply don't see anything in Leopard as a letdown, just like some Windows fans didn't see Vista as a letdown. It's a matter of perspective, needs, and expectations. There's no UAC, no WGA to contend with. More to the point, there's only one version of OS X for consumers to purchase.

In short, Leopard is a more user-friendly OS than Windows Vista.

Before you get your panties in a bunch, remember that I can't stand iTunes – it's an unwieldy way of managing media (even on OS X). Moreover, I don't like the way iPhoto manages metadata; I dream of the day Picasa gets ported to the Mac. Not everything that Apple does is pure genius. However, as far as a desktop platform and experience is concerned for the average user, Leopard is an absolute winner. It has 100 more "Wow"s than Windows Vista, and you don't have to look very far to find 'em.

Windows and OS X can peacefully co-exist, I believe – so long as Windows is running on either a Boot Camp partition or inside a virtual machine. The power of the PC is that it can

support a billion different configurations, but some of us are at the point in our lives where we only need one config to work. I've come to this realization, and I don't find it sad at all – I find it uplifting.

I'll get attacked by the apologists, and I'm sure I'll be opening myself up to a whole new wave of attacks. I'd be equally as vocal about user interface inconsistencies on OS X as I am with Windows (and believe me, there are still plenty of 'em – as [Gruber](#) has attested)!

### *Sun Microsystems*

**Sun Microsystems, Inc.** (NASDAQ: JAVA)<sup>[3]</sup> is a multinational vendor of computers, computer components, computer software, and information technology services, founded on February 24, 1982.<sup>[4]</sup> The company is headquartered in Santa Clara, California (part of Silicon Valley), on the former west campus of the Agnews Developmental Center.

Products include computer servers and workstations based on its own SPARC processors as well as AMD's Opteron and Intel's Xeon processors; storage systems; and, a suite of software products including the Solaris Operating System, developer tools, Web infrastructure software, and identity management applications. Other technologies of note include the Java platform, MySQL and NFS.

Sun is a proponent of open systems in general and Unix in particular, and a major contributor to open source software.<sup>[5]</sup>

On April 20, 2009, Sun and Oracle Corporation announced that they entered into a definitive agreement under which Oracle will acquire Sun for \$7.4 billion.<sup>[6][7]</sup> Sun shareholders approved the

acquisition on July 16, 2009. See section "Acquisition by Oracle" for the progress of the deal.

Sun's manufacturing facilities are located in Hillsboro, Oregon, USA and Linlithgow, Scotland.

Aerial photograph of the Sun headquarters campus in Santa Clara, California.



Buildings 21 and 22 at Sun's headquarters campus in Santa Clara



Sun in Markham, Ontario, Canada

The initial design for what became Sun's first Unix workstation, the Sun 1, was conceived by Andy Bechtolsheim when he was a graduate student at Stanford University in Palo Alto, California. He originally designed the SUN workstation for the Stanford University Network communications project as a personal CAD workstation. It was designed as a 3M computer: 1 MIPS, 1 Megabyte and 1 Megapixel. It was designed around the Motorola 68000 processor with an advanced Memory management unit (MMU) to support the Unix operating system with virtual memory

support.<sup>[8]</sup> He built the first ones from spare parts obtained from Stanford's Department of Computer Science and Silicon Valley supply houses.<sup>[9]</sup>

On February 12, 1982 Vinod Khosla, Andy Bechtolsheim, and Scott McNealy, all Stanford graduate students, founded *Sun Microsystems*. Bill Joy of Berkeley, a primary developer of BSD, joined soon after and is counted as one of the original founders.<sup>[10]</sup> The Sun name is derived from the initials of the Stanford University Network.<sup>[11]</sup> Sun was profitable from its first quarter in July 1982.

Sun's initial public offering was in 1986 under the stock symbol *SUNW*, for *Sun Workstations* (later *Sun Worldwide*).<sup>[12][13]</sup> The symbol was changed in 2007 to *JAVA*; Sun stated that the brand awareness associated with its Java platform better represented the company's current strategy.<sup>[14]</sup>

Sun's logo, which features four interleaved copies of the word *sun*, was designed by professor Vaughan Pratt, also of Stanford University. The initial version of the logo had the sides oriented horizontally and vertically, but it was subsequently redesigned so as to appear to stand on one corner.

## **The "Bubble" and its aftermath**

During the dot-com bubble, Sun experienced dramatic growth in revenue, profits, share price, and expenses. Some part of this was due to genuine expansion of demand for web-serving cycles, but another part was synthetic, fueled by venture capital-funded startups building out large, expensive Sun-centric server presences in the expectation of high traffic levels that never materialized. The share price in particular period increased to a level that even the company's executives were hard-pressed to defend. In response to this business growth, Sun expanded aggressively in all areas: head-count, infrastructure, and office space.

The bursting of the bubble in 2001 was the start of a period of poor business performance for Sun.<sup>[15]</sup> Sales dropped as the growth of online business failed to meet predictions. As online businesses closed and their assets were auctioned off, a large amount of used high-end Sun hardware was available very cheaply. This hurt Sun's business as it relied a great deal on hardware sales.

Multiple quarters of substantial losses and declining revenues have led to repeated rounds of layoffs,<sup>[16][17][18]</sup> executive departures, and expense-reduction efforts. In December 2001 the share price dropped to the 1998 pre-bubble level of about one hundred dollars or so and then kept going, a rapid fall even by the standards of the high-tech sector at that time. The stock dipped below 10 dollars a year later, one-tenth of its 1990 value, then quickly bounced back to 20, where it has hovered ever since. In mid-2004, Sun ceased manufacturing operations at their Newark, California facility and consolidated all of the company's US-based manufacturing operations to their Hillsboro, Oregon facility, as part of continued cost-reduction efforts.<sup>[19]</sup> In 2006 Sun closed the Newark campus completely and moved 2,300 staff to its other campuses in the area.<sup>[20]</sup>

Many companies (like E-Trade and Google) chose to build Web applications based on large numbers of the less expensive PC-class x86-architecture servers running GNU/Linux, rather than a smaller number of high-end Sun servers. They reported benefits including substantially lower expenses (both acquisition and maintenance) and greater flexibility based on the use of open-source software.

Sun responded to this in several ways, including introducing its own lines of x86-based servers to compete directly in that market, re-launching development of Solaris on the x86 platform and releasing the open-source OpenSolaris to drive interest in using Solaris, and coming out with lower cost horizontally-scaled SPARC systems (see below).

Higher level telecoms control systems such as NMAS and OSS service predominantly use Sun equipment. This use is due mainly to the company basing its products around a mature and very stable version of the Unix operating system and the support service that Sun provides.

## **Present focus**

In 2004, Sun canceled two major processor projects which emphasized high instruction level parallelism and operating frequency. Instead, the company chose to concentrate on processors optimized for multi-threading and multiprocessing, such as the UltraSPARC T1 processor (codenamed "Niagara"). The company also announced a collaboration with Fujitsu to use the Japanese company's processor chips in mid-range and high-end Sun servers. These servers were announced on April 17, 2007 as the M-Series, part of the SPARC Enterprise series.

In February 2005, Sun announced the Sun Grid, a grid computing deployment on which it offers utility computing services priced at \$1 (US) per CPU/hour for processing and per GB/month for storage. This offering builds upon an existing 3,000-CPU server farm used for internal R&D for over 10 years, of which Sun markets as being able to achieve 97% utilization. In August 2005, the first commercial use of this grid was announced for financial risk simulations which was later launched as its first Software as a Service product.<sup>[21]</sup>

In January 2005, Sun reported a net profit of \$19 million for fiscal 2005 second quarter, for the first time in three years. This was followed by net loss of \$9 million on GAAP basis for the third quarter 2005, as reported on April 14, 2005. In January 2007, Sun reported a net GAAP profit of \$126 million on revenue of \$3.337 billion for its fiscal second quarter. Shortly following that news, it was announced that Kohlberg Kravis Roberts (KKR) would invest \$700 million in the company.<sup>[22]</sup>

In recent years Sun's engineering work has become international, with substantial groups in Bangalore, Beijing, Dublin, Grenoble, Hamburg, Prague, St. Petersburg, Tel Aviv, Tokyo, and Trondheim.<sup>[23]</sup>

In 2007–2008, Sun posted revenue of \$13.8 billion and has \$2 billion in cash. First-quarter 2008 losses were \$1.68 billion; revenue fell 7% to \$2.99 billion. Sun's stock lost 80% of its value November 2007 to November 2008, reducing the company's market value to \$3 billion. With falling sales to large corporate clients, Sun announced plans to lay off 5,000 to 6,000 workers, or 15-18% of its work force. It expects to save \$700 million to \$800 million a year as a result of the moves, while also taking up to \$600 million in charges in the next 12 months.<sup>[24]</sup>

On August 31, 2009, while announcing the Q4 results, Sun Microsystems reported net loss of \$147m, compared to net profit of \$88m an year-ago.<sup>[25]</sup>

A weekly summary of news about Sun and its products is posted to "System News for Sun Users",<sup>[26]</sup> now in its 10th year.

## **Acquisition by Oracle**

Early in 2009, according to unconfirmed press reports, Sun entered into acquisition talks with IBM. On April 20, 2009, Sun and Oracle Corporation announced that they entered into a definitive agreement under which Oracle will acquire Sun for \$9.50 a share in cash. Net of Sun's cash and debt, this amounts to a \$5.6 billion dollar offer from Oracle. Sun's shareholders voted to approve the proposal on July 16, 2009, but the deal was still subject to regulatory approvals.<sup>[27]</sup>

On August 20, 2009 it was reported that the U.S. government approved Oracle's purchase of Sun.<sup>[28]</sup>



In addition the Federal Antimonopoly Service of Russia extended the deadline for the approval of the Oracle's request (dated by August 4, 2009) regarding Sun's subsidiaries in Moscow and St. Petersburg.<sup>[29]</sup>

On September 3, 2009, the European Commission announces that it will perform a second round of investigation of the deal, focusing on the impact of the purchase of MySQL (now owned by Sun) by Oracle. The deadline is set to January 19, 2010, but some analysts hope that the decision will be made much earlier.<sup>[30]</sup>

## Sun acquisitions



Sun server racks.

*This list is incomplete; you can help by expanding it.*

- 1987 - Trancept Systems, a high performance graphics hardware company<sup>[31]</sup>
- 1987 - Centram Systems West, maker of networking software for PCs, Macs and Sun systems
- 1988 - Folio, Inc., developer of intelligent font scaling technology and the F3 font format<sup>[32]</sup>
- 1991 - INTERACTIVE Systems Corporation's Intel/Unix OS division, from Eastman Kodak Company
- 1992 - Praxsys Technologies, Inc., developers of the Windows emulation technology that eventually became Wabi<sup>[33]</sup>
- 1994 - Thinking Machines Corporation hardware division
- 1996 - Lighthouse Design, Ltd.<sup>[34]</sup>

- 1996 - Cray Business Systems Division, from Silicon Graphics<sup>[35]</sup>
- 1996 - Integrated Micro Products, specializing in fault tolerant servers
- 1996 - Thinking Machines Corporation software division
- February 1997 - LongView Technologies, LLC <sup>[36]</sup>
- August 1997 - Diba, a technology supplier for the Information Appliance industry<sup>[37]</sup>
- September 1997 - Chorus Systems, creators of ChorusOS<sup>[38]</sup>
- November 1997 - Encore Computer Corporation's storage business <sup>[39]</sup>
- 1998 - RedCape Software
- 1998 - i-Planet, a small software company that produced the "Pony Espresso" mobile email client—most notable product of this acquisition was the later use of its name (sans hyphen) for the Sun-Netscape software alliance
- July 1998 - NetDynamics<sup>[40]</sup> - developers of the NetDynamics Application Server <sup>[41]</sup>
- 1999 - German software company StarDivision and with it StarOffice, which was later released as open source under the name OpenOffice.org
- 1999 - MAXSTRAT Corporation, a network storage company located in Milpitas, CA specializing in Fibre Channel storage servers.
- 1999 - Forte, an enterprise software company specializing in integration solutions and developer of Forte 4GL and TeamWare
- 1999 - NetBeans, a newly formed business producing a modular IDE written in Java, based on a student project at Charles University in Prague.
- March 2000 - Innosoft International, Inc. a software company specializing in highly scalable MTAs (PMDf) and Directory Services.

- July 2000 - Gridware, a software company whose products managed the distribution of large computing jobs across multiple computers<sup>[42]</sup>
- September 2000 - Cobalt Networks, an Internet appliance manufacturer<sup>[43]</sup>
- December 2000 - HighGround, with a suite of Web-based management solutions support wide range of storage technologies and applications<sup>[44]</sup>
- 2001 - LSC, Inc., an Eagan, Minnesota company that developed Storage and Archive Management File System(SAM-FS) and Quick File System QFS high performance file systems for backup and archive
- March 2002 - Clustra Systems <sup>[45]</sup>
- June 2002 - Afara Websystems, a company that develops next-generation SPARC processor-based technology<sup>[46]</sup>
- September 2002 - Pirus Networks, specializing in intelligent storage services<sup>[47]</sup>
- November 2002 - Terraspring, a pioneer in infrastructure automation software<sup>[48]</sup>
- June 2003 - Pixo, adds to the capabilities of the Sun Content Delivery Server<sup>[49]</sup>
- August 2003 - CenterRun, Inc.<sup>[50]</sup>
- December 2003 - Waveset Technologies, an identity management solutions company<sup>[51]</sup>
- January 2004 - Nauticus Networks <sup>[52]</sup>
- February 2004 - Kealia, a startup founded by original Sun founder Andy Bechtolsheim, which had been focusing on high-performance AMD-based 64-bit servers<sup>[53]</sup>
- January 2005 - SevenSpace, a multi-platform managed services provider<sup>[54]</sup>
- May 2005 - Tarantella, Inc. (formerly known as Santa Cruz Operation (SCO)), for \$25,000,000<sup>[55]</sup>
- June 2005 - SeeBeyond, SOA software company for \$387m<sup>[56]</sup>
- June 2005 - Procom Technology, Inc.'s NAS IP Assets<sup>[57]</sup>

- August 2005 - StorageTek <sup>[58]</sup>
- February 2006 - Aduva, producer of software for Solaris and Linux patch management <sup>[59]</sup>
- October 2006 - Neogent <sup>[60]</sup>
- April 2007 - SavaJe, developer of the SavaJe OS, a Java OS for mobile phones
- September 2007 - Cluster File Systems, Inc. <sup>[61]</sup>
- November 2007 - Vaau, provider of Enterprise Role Management and identity compliance solutions <sup>[62]</sup>
- February 2008 - MySQL AB, the company offering the popular open source database MySQL <sup>[63]</sup>
- February 2008 - Innotek GmbH, developer of the VirtualBox virtualization product <sup>[64][65]</sup>
- April 2008 - Montalvo Systems, failed x86 microprocessor startup acquired before first silicon
- January 2009 - Q-layer, a software company with cloud computing solutions <sup>[66]</sup>

## **Major stockholders**

As of May 11, 2009, the following shareholders held over 100,000 common shares of Sun: <sup>[67]</sup>

- Barclays Global Investors, 37,606,402
- Scott G. McNealy, 14,566,433
- Kenneth M. Oshman, 584,985
- Jonathan I. Schwartz, 536,109
- James L. Barksdale, 231,785
- Michael E. Lehman, 106,684

## **Hardware**

For the first decade of Sun's history, the company was predominantly a vendor of technical workstations, competing

successfully as a low-cost vendor during the Workstation Wars of the 1980s. It now has shifted its hardware product line to emphasize servers and storage.

### **Motorola-based systems**

Sun originally used the Motorola 68k CPU family for the Sun-1 through Sun-3 computer series. The Sun-1 employed a 68000 CPU, the Sun-2 series, a 68010. The Sun-3 series was based on the 68020, with the later Sun-3x variant using the 68030.

### **SPARC-based systems**

See also: SPARC



#### **SPARCstation 1+**

In 1987, the company began using *SPARC*, a processor architecture of its own design, in its computer systems, starting with the Sun-4 line. SPARC was initially a 32-bit architecture until the introduction of the SPARC V9 architecture in 1995, which added 64-bit extensions.

Sun has developed several generations of SPARC-based computer systems, including the SPARCstation, Ultra and Sun Blade series of workstations, and the SPARCserver, Netra, Enterprise and Sun Fire line of servers.

In the early 1990s the company began to extend its product line to include large-scale symmetric multiprocessing servers, starting with the four-processor SPARCserver 600MP. This was followed by the 8-processor SPARCserver 1000 and 20-processor SPARCcenter 2000, which were based on work done in conjunction with Xerox PARC. In the late 1990s this transformation was accelerated by the acquisition of Cray Business Systems Division from Silicon Graphics.<sup>[35]</sup> Their 32-bit, 64-processor Cray Superserver 6400, related to the SPARCcenter, led to the 64-bit Sun Enterprise 10000 high-end server (otherwise known as *Starfire*). More recently, Sun has also ventured into the *blade server* (high density rack-mounted systems) market.

In November 2005 Sun launched the UltraSPARC T1, notable for its ability to concurrently run 32 threads of execution on 8 processor cores. Its intent was to drive more efficient use of CPU resources, which is of particular importance in data centers, where there is an increasing need to reduce power and air conditioning demands, much of which comes from the heat generated by CPUs. The T1 was followed by the UltraSPARC T2, which extended the number of threads per core from 4 to 8, and T2 Plus, which added the ability to have multiple T2 processors in one system. Sun has open sourced the design specifications of both the T1 and T2 processors via the OpenSPARC project.

In April 2007, Sun released the SPARC Enterprise server products, jointly designed by Sun and Fujitsu and based on Fujitsu SPARC64 VI and later processors. The *M-class* SPARC Enterprise systems include high-end reliability and availability features.

### **x86-based systems**

In the late 1980s, Sun also marketed an Intel 80386-based machine, the Sun386i; this was designed to be a hybrid system, running SunOS but at the same time supporting DOS applications. This only remained on the market for a brief period of time. A

follow-up "486i" upgrade was announced but only a few prototype units were ever manufactured.

Sun's brief first foray into x86 systems ended in the early 1990s, as it decided to concentrate on SPARC and retire the last Motorola systems and 386i products, a move dubbed by McNealy as "all the wood behind one arrowhead". Even so, Sun kept its hand in the x86 world, as a release of Solaris for PC compatibles began shipping in 1993.

In 1997 Sun acquired Diba, Inc., followed later by the acquisition of Cobalt Networks in 2000, with the aim of building *network appliances* (single function computers meant for consumers). Sun also marketed a *network computer* (a term popularized and eventually trademarked by Oracle); the JavaStation was a diskless system designed to run Java applications.

Although none of these business initiatives were particularly successful, the Cobalt purchase gave Sun a toehold for its return to the x86 hardware market. In 2002, Sun introduced its first general purpose x86 system, the LX50, based in part on previous Cobalt system expertise. This was also Sun's first system announced to support Linux as well as Solaris.

In 2003, Sun announced a strategic alliance with AMD to produce x86/x64 servers based on AMD's Opteron processor; this was followed shortly by Sun's acquisition of Kealia, a startup founded by original Sun founder Andy Bechtolsheim, which had been focusing on high-performance AMD-based servers.

The following year, Sun launched the Opteron-based Sun Fire V20z and V40z servers, and the Java Workstation W1100z and W2100z workstations.

On September 12, 2005, Sun unveiled a new range of Opteron-based servers: the Sun Fire X2100, X4100 and X4200 servers.<sup>[68]</sup>

These were designed from scratch by the team led by Bechtolsheim to address heat and power consumption issues commonly faced in data centers. In July 2006, the Sun Fire X4500 and X4600 systems were introduced, extending what is now a line of x64 systems that support not only Solaris, but Linux and Microsoft Windows as well.

On January 22, 2007, Sun announced a broad strategic alliance with Intel.<sup>[69]</sup> Intel now endorses Solaris as a mainstream operating system and as its mission critical UNIX OS for its Xeon processor-based systems, and also contributes engineering resources to OpenSolaris.<sup>[70]</sup> Sun began using the Intel Xeon processor in its x64 server line, starting with the Sun Blade X6250 server module introduced in June 2007.

On May 5, 2008, AMD announced that its Operating System Research Center (OSRC) expanded its focus to include optimization to Sun's OpenSolaris and xVM virtualization products for AMD based processors.<sup>[71]</sup>

## **Software**

Although Sun was initially known as a hardware company, its software history began with its founding in 1982; co-founder Bill Joy was one of the leading Unix developers of the time, having already contributed the vi editor, the C shell, and significant work on the TCP/IP stack to the BSD Unix OS. Since then, Sun has developed and acquired other software, and become widely known for the Java programming language.

Sun is known for community-based and open-source licensing of its major technologies, and for its support of its products with other open source technologies. Sun offers GNOME-based desktop software called Java Desktop System (originally code-named "Madhatter"), first distributed as a Linux implementation but now offered as part of the Solaris operating system. It supports its Java



Enterprise System (a middleware stack) on Linux. It has released the source code for Solaris under the open-source Common Development and Distribution License, via the OpenSolaris community. Sun's positioning includes a commitment to indemnify users of some software from intellectual property disputes concerning that software. It offers support services on a variety of pricing bases, including per-employee and per-socket.

A report prepared for the EU by UNU-MERIT stated that Sun is the largest corporate contributor to open source movements in the world.<sup>[72]</sup> According to this report, Sun's open source contributions exceed the combined total of the next five largest commercial contributors.

## **Operating systems**

Main article: Solaris (operating system)

Sun is most well known for its Unix systems, which have a reputation for system stability and a consistent design philosophy.

Sun's first workstation shipped with UniSoft V7 Unix. Later in 1982 Sun began providing SunOS, a customized 4.1BSD Unix, as the operating system for its workstations.

In the late 1980s, AT&T tapped Sun to help them develop the next release of their branded UNIX, and in 1988 announced they would purchase up to a 20% stake in Sun.<sup>[73]</sup> UNIX System V Release 4 (SVR4) was jointly developed by AT&T and Sun; this partnership triggered concern among Sun's competitors, many of whom banded together to form the Open Software Foundation (OSF). By the mid-1990s, the ensuing Unix wars had largely subsided, AT&T had sold off their Unix interests, and the relationship between the two companies was significantly reduced.

Sun used SVR4 as the foundation for Solaris 2, which became the successor to SunOS.

From 1992 Sun also sold INTERACTIVE UNIX, an operating system it acquired when it bought INTERACTIVE Systems Corporation from Eastman Kodak Company. This was a popular UNIX variant for the PC platform and a major competitor to market leader SCO UNIX. Sun's focus on INTERACTIVE UNIX diminished in favor of Solaris on both SPARC and x86 systems; it was dropped as a product in 2001.<sup>[citation needed]</sup>

In the past, Sun has offered a separate variant of Solaris called Trusted Solaris, which included augmented security features such as multilevel security and a least privilege access model. Solaris 10 included many of the same capabilities as Trusted Solaris when it was released in 2005; the Solaris 10 11/06 update included Solaris Trusted Extensions, which give it the remaining capabilities needed to make it the functional successor to Trusted Solaris.

Following several years of difficult competition and loss of server market share to competitors' Linux-based systems, Sun began to include Linux as part of its strategy in 2002. Sun supports both Red Hat Enterprise Linux and SUSE Linux Enterprise Server on its x64 systems; companies such as Canonical Ltd., Wind River Systems and MontaVista also support their versions of Linux on Sun's SPARC-based systems.

In 2004, Sun surprised the industry when, after having cultivated a reputation as one of Microsoft's most vocal antagonists, it entered into a joint relationship with them, resolving various legal entanglements between the two companies and receiving US\$1.95 billion in settlement payments from them.<sup>[74]</sup> Sun now supports Microsoft Windows on its x64 systems, and has announced other collaborative agreements with Microsoft, including plans to support each others' virtualization environments.<sup>[75]</sup>

## **Java platform**

Main article: Java platform

The Java platform was developed at Sun in the early 1990s with the objective of allowing programs to function regardless of the device they were used on, sparking the slogan "Write once, run anywhere" (WORA). While this objective has not been entirely achieved (prompting the riposte "Write once, debug everywhere"), Java is regarded as being largely hardware- and operating system-independent.

Java was initially promoted as a platform for client-side *applets* running inside web browsers. Early examples of Java applications were the HotJava web browser and the HotJava Views suite. However, since then Java has been more successful on the server side of the Internet.

The platform consists of three major parts, the Java programming language, the Java Virtual Machine (JVM), and several Java Application Programming Interfaces (APIs). The design of the Java platform is controlled by the vendor and user community through the Java Community Process (JCP).

Java is an object-oriented programming language. Since its introduction in late 1995, it has become one of the world's most popular programming languages.<sup>[76]</sup>

In order to allow programs written in the Java language to be run on virtually any device, Java programs are compiled to byte code, which can be executed by any JVM, regardless of the environment.

The Java APIs provide an extensive set of library routines. These APIs have evolved into the *Standard Edition* (Java SE), which provides basic infrastructure and GUI functionality; the *Enterprise Edition* (Java EE), aimed at large software companies implementing enterprise-class application servers; and the *Micro Edition* (Java ME), used to build software for devices with limited resources, such as mobile devices.

On November 13, 2006, Sun announced that it would be licensing its Java implementation under the GNU General Public License; it released its Java compiler and JVM at that time.<sup>[77]</sup>

In February 2009 Sun entered a battle with Microsoft and Adobe Systems, which are promoting rival platforms to build software applications for the Internet.<sup>[78]</sup> JavaFX is a development platform for music, video and other applications that builds on the Java programming language.<sup>[78]</sup>

## **Office suite**

In 1999, Sun acquired the German software company StarDivision and with it StarOffice, which it released as the office suite OpenOffice.org under both GNU LGPL and the SISSL (Sun Industry Standards Source License). OpenOffice.org supports Microsoft Office file formats (though not perfectly), is available on many platforms (primarily Linux, Microsoft Windows, Mac OS X, and Solaris) and is widely used in the open source community.

The current StarOffice product is a closed-source product based on OpenOffice.org. The principal differences between StarOffice and OpenOffice.org are that StarOffice is supported by Sun, is available as either a single-user retail box kit or as per-user blocks of licensing for the enterprise, and includes a wider range of fonts and document templates and a commercial quality spellchecker.<sup>[79]</sup> StarOffice also contains commercially licensed functions and add-ons; in OpenOffice.org these are either replaced by open-source or free variants, or are not present at all. Both packages have native support for the OpenDocument format.

## **Virtualization and datacenter automation software**

VirtualBox, now owned by Sun Microsystems

In 2007, Sun announced the Sun xVM virtualization and datacenter automation product suite for commodity hardware. Sun also acquired VirtualBox in 2008. Earlier virtualization technologies from Sun like *Dynamic System Domains* and *Dynamic Reconfiguration* were specifically designed for high-end SPARC servers, and Logical Domains only supports the UltraSPARC T1/T2/T2 Plus server platforms. Sun also has the *NI* provisioning software <sup>[80]</sup> for datacenter automation.

On the client side, Sun offers virtual desktop solutions. Complete desktop environments and applications can be hosted in the datacenter, with users accessing these environments from a wide range of client devices, including Microsoft Windows PCs, Sun Ray virtual display clients, Apple Macintoshes, PDAs or any combination of supported devices. A variety of networks are supported, from LAN to WAN or the public Internet. A virtual desktop solution can be provided through Sun Ray Software, Sun Secure Global Desktop and Sun Virtual Desktop Infrastructure.

## **Database management systems**

Sun acquired MySQL AB, the developer of the MySQL database in 2008 for US\$ 1 billion.<sup>[81]</sup> CEO Jonathan Schwartz mentioned in his blog that optimizing the performance of MySQL is one of the priorities of the acquisition.<sup>[82]</sup> In February 2008, Sun began to publish results of the MySQL performance optimization work.<sup>[83]</sup> Sun is also a contributor to the PostgreSQL project. On the Java platform, Sun contributes to, ships, and offers support for JavaDB.

## **Other software**

Sun offers a range of other software products for software development and infrastructure services. Many of these products were developed in house; others have come from a series of acquisitions, including Tarantella, Waveset Technologies,<sup>[51]</sup> SeeBeyond, and Vaau. Sun also acquired many of the Netscape

non-browser software products as part a deal involving Netscape's merger with AOL.<sup>[84]</sup> These software products were initially offered under the *iPlanet* brand; once the Sun-Netscape alliance ended, they were re-branded as *Sun ONE* (Sun Open Network Environment), and more recently as the *Sun Java System*.

Today, Sun's middleware stack is branded as the *Java Enterprise System* (or JES), and fulfills web and application serving, as well as communication, calendaring, directory, identity management and SOA/business integration roles. Sun's Open ESB and other software suites are available for download and use free of charge on systems running Solaris, Red Hat Enterprise Linux, HP-UX, and Windows, with support available optionally.

Sun has developed data center management software products, which include the *Solaris Cluster* high availability software, and a grid management package called *Sun Grid Engine* and firewall software such as SunScreen.

Sun also produces a suite of compilers and development tools under the *Sun Studio* brand, for building and developing Solaris and Linux applications.

Sun has recently entered the Software as a Service (SaaS) market with zembly, a social cloud-based computing platform and Project Kenai, an open-source project hosting service.

## **Storage**

Sun has long sold its own storage systems to complement its system offerings; it has also made several storage-related acquisitions. On June 2, 2005, Sun announced it would purchase Storage Technology Corporation (StorageTek) for US\$4.1 billion in cash, or \$37.00 per share, a deal completed in August 2005.

In 2006, Sun introduced the Sun StorageTek 5800 System, the world's first application-aware programmable storage solution. In 2008, Sun contributed the source code of the StorageTek 5800 System under the BSD license. <sup>[85]</sup>

Sun announced the Sun Open Storage platform in 2008. Built with open and open source technologies, Sun hopes to remove vendor lock-in in the storage market.

In late 2008 Sun announced the *Sun Storage 7000 Unified Storage Systems* (codenamed Amber Road). Transparent placement of data in the systems' solid-state drives (SSD) and conventional hard drives is managed by ZFS in a way to take advantage of the speed of SSDs and the economy of conventional hard disks. <sup>[86]</sup>

*New features of the future Windows Media Player 12*

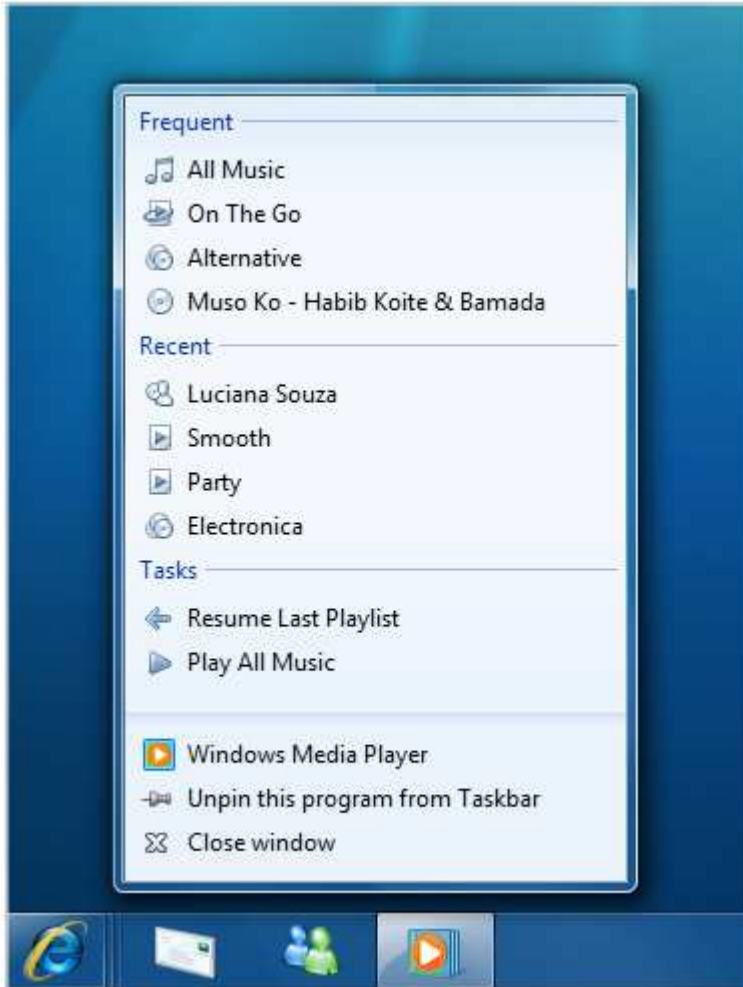


**Microsoft** has already confirmed that Windows Media Player will remain the core of its next operating system: **Windows 7**. **Windows 7** will come standard with the new version of the player, **Windows Media Player 12**, which includes several striking characteristics.

The new version of Microsoft's media player will have a **graphical interface** more appealing and lighter than that of his predecessor **WMP11**. Some elements and buttons on the toolbar have changed their site, but the experience should be very familiar to users of Windows Media Player 11. The first **big change** was the elimination of the button "**now playing**" in **WMP11** changed the view of the **current playlist**. This is because **WMP12** completely separates the administration of the library media of what is currently playing. **To do so, it makes use of two modes / different view: Now Playing and Library.**

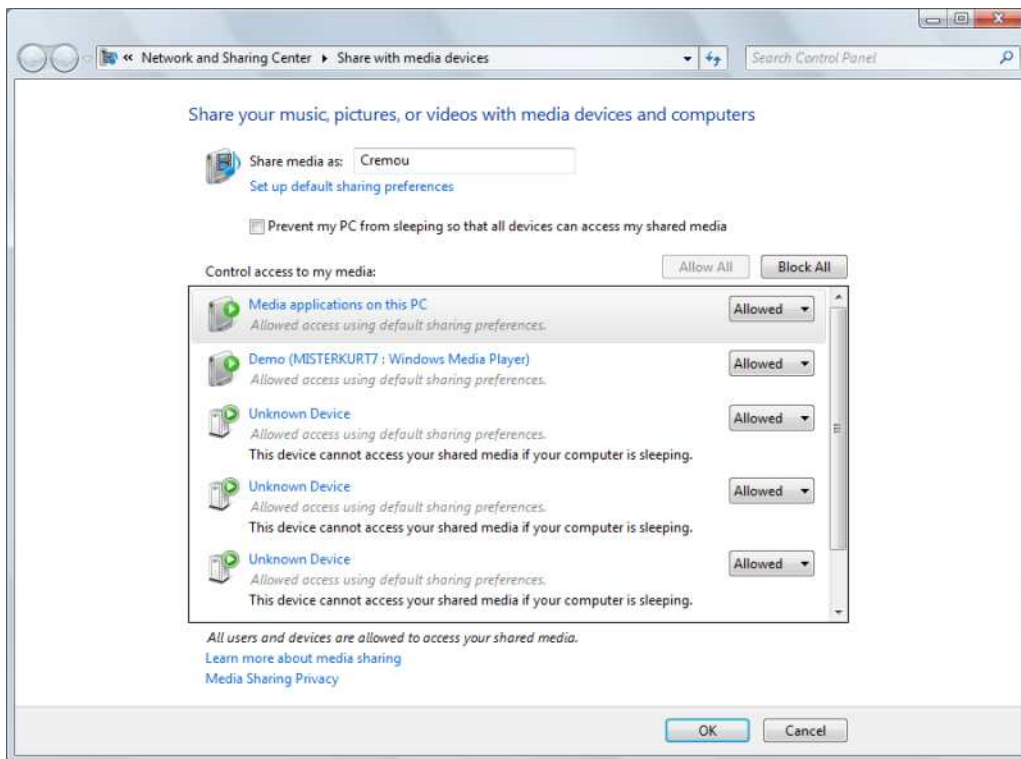


They have also added a new **taskbar miniviewer** that works with the new **Windows 7 taskbar**, and **WMP12** includes support for **Jump Lists**.



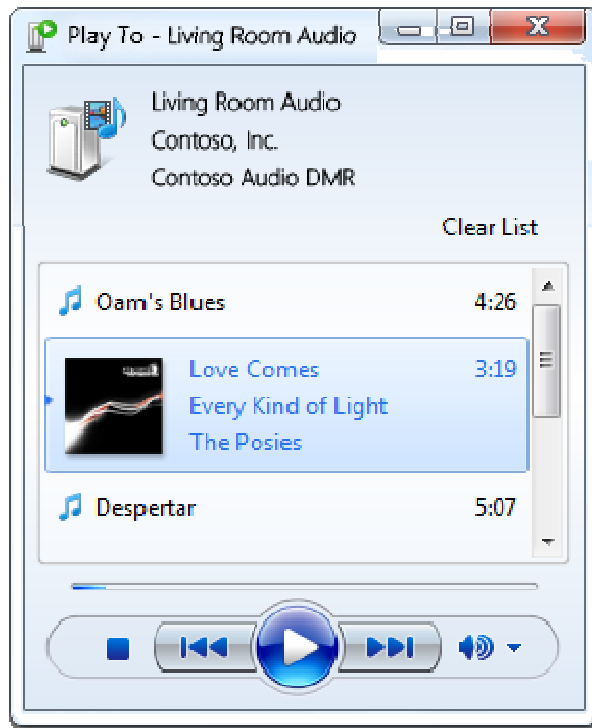
Although the operation is very similar to WMP11, there are a number of notable improvements or perhaps better say, tinkering. As such, this preview is automatic, something widespread in Linux, that leaving the mouse over a song, playing part of it without having to open it. Another change is that the library now displays at a time audio, video, TV and pictures.

Arriving at the video playback, we welcome the news that it integrates a huge variety of codecs that support the vast majority of formats that are circulating on the Internet. WMP12 includes support for H.264 video, AAC audio and Xvid both as well as all the DivX format for he previous version of WMP11 series MPEG2, WMV, MP3, and so on.

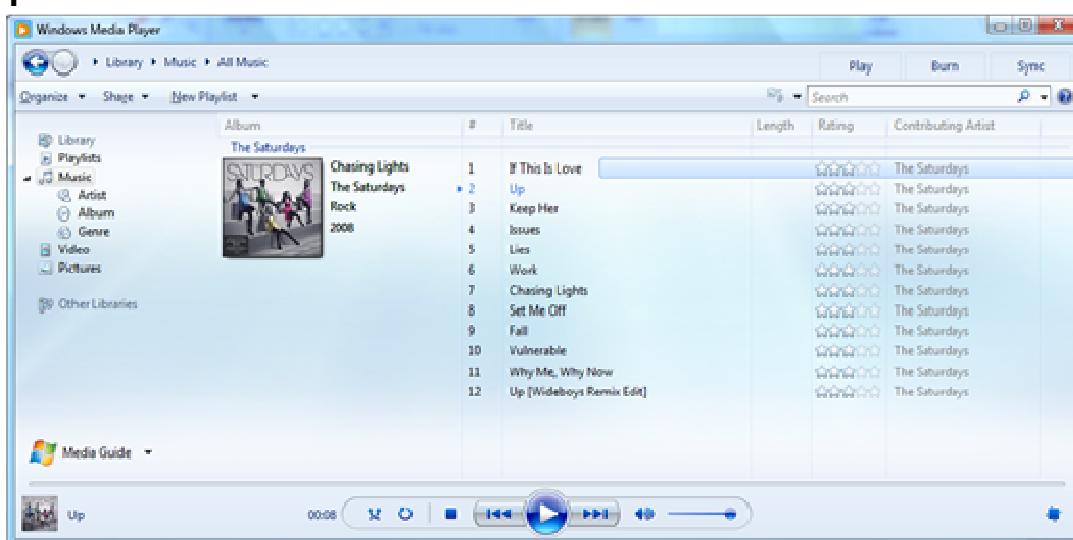


Another improvement is the remote management of libraries, now allows the use of iTunes libraries, although the problem of not being able to play the tracks that have DRM. It's not just libraries that are improved. WMP12 makes it easier to play back audio or video on remote devices, a feature dubbed

## “Play To.”



**WMP12** can stream to other computers in your HomeGroup, so, for example, you can browse your library on your laptop but actually play back on the HTPC connected to your sound system



As well as streaming to remote PCs, WMP12 also includes support for controlling Digital Living Network Alliance v1.5 devices. These are networked devices with audio and/or video playback capabilities; so, similar to the scenario of streaming to an HTPC, you might be streaming audio to a [Sonos](#) box. Each device being Played To has its own playlist and playback settings and is controlled through its own little window.

If a device can't handle the format being streamed, **WMP12 will detect this automatically and transcode it on-the-fly.**