

STEAMOS

AND THE DEMOCRATISATION OF GAMING

Discover how Valve singlehandedly changed the future history of games on Linux.

Valve is a video games company with some serious history. It created genre-defining games with its Half-Life series. It built a cutting-edge games engine used by its own titles, and then went on to dominate digital games distribution with Steam, long before Apple thought about walled gardens and app stores.

But none of this history has been played out on Linux: until relatively recently, Valve was entirely wedded to Microsoft Windows, the master system of PC gaming. This was due to several factors; Windows had been able to maintain a position it held since the end of the DOS gaming era, thanks to its DirectX games API. Almost two decades of intense competition between the accelerated graphics hardware manufacturers had dropped prices and boosted performance, and the Windows drivers for them worked well. Windows was actually a pretty good gaming platform.

But all that has changed with Windows 8, at least for Valve. Gabe Newell, Valve's co-founder and managing director, has said that Windows 8 is a "catastrophe", which is somewhat ironic considering that he worked for Microsoft for 13 years before Valve, and was, according to one interview, "the producer on the first three releases of Windows." But users are also reconsidering their commitment to Microsoft's operating system in the face of both user-interface and community challenges. Microsoft wants the Xbox

One to become its proxy for home entertainment, and its changing attitudes to core technologies such as DirectX and .Net have left many developers looking to broaden their asset pools and experience.

And then there's the emergence of independent development studios, many of which are now accustomed to developing for consoles, tablets, smartphones and PCs using cross-platforms tools and APIs. For them, Windows is just another platform.

Next-gen gaming

The next generation of gaming consoles have also helped shift priorities. The PlayStation 3, for example, was notorious for its use of proprietary technology, forcing developers to learn techniques specific to a single (complex) platform, rather than the

cross-platform approach taken by most studios. Now that both the Xbox One and the PlayStation 4 are based on what are essentially standard PC components, the only differentiators are their operating system and development environments (and performance, of course). On the one hand you have the PlayStation 4 running an operating system based on FreeBSD and using all kinds of open source tools, and on the other you've got Microsoft with its latest incarnation of DirectX. The result is that it makes sense for most games development, for most games studios, to be cross-platform, enabling studios

"Valve's future, and potentially the future of PC gaming itself, is now dependent on Linux."

Valve and open source

Valve isn't a natural Linux company. It rarely responds to emails, and its approach to the Linux community is somewhat detached compared with that of some other companies or distributions. However, it has given the complete library of all Valve-produced games to both Ubuntu and Debian developers in recognition of the work they've done to build the basis of SteamOS, and Valve's own team are beginning to have an effect on the open source tools that they themselves are modifying.

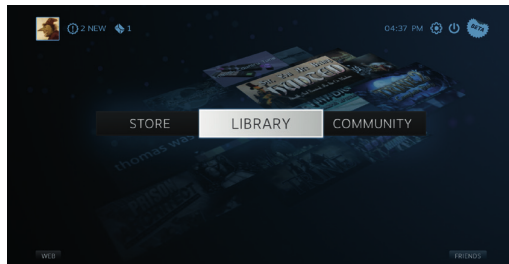
Its biggest contribution is the DirectX To OpenGL translation layer, which it uploaded to GitHub under the MIT licence (<https://github.com/ValveSoftware>). This neat bit of software helps developers migrate from Windows-only games, and could even help games for Microsoft's Xbox 360 console be ported to SteamOS/Linux.

Valve has also sponsored work on the Mesa project, the open source libraries that implement OpenGL with hardware acceleration, to help improve shader compilation time. The improvement should help the launch time of games using those shaders, and patches have already shaved 20 seconds off the launch time of Dota 2. Valve has also been helping make improvements to the XPad kernel driver. This is the driver used by many Xbox and Xbox-alike controllers, which have become close to being a standard on Linux and whose button mappings are the default in Steam. Valve's own Steam Controller uses the same driver, and the patches so far submitted help with dynamic wireless device creation and LED feedback. Finally, despite their not being open source, Valve has been working with Nvidia to improve its proprietary drivers.

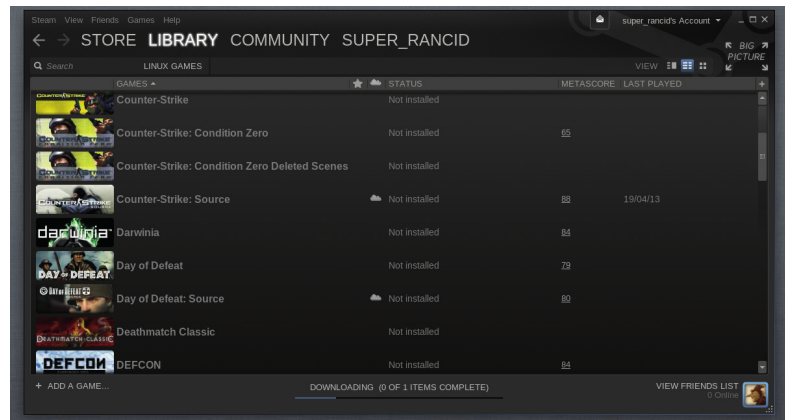
to release games for many platforms without the corresponding ramp in resources.

Valve has watched this shift in development priorities, and also watched Microsoft become more single-minded and controlling. It must have also seen the launch of Apple's app store and games portals, both on iOS and OS X, and noted that it will never be able to compete on a level playing field while in someone else's walled garden. The same could also be true, to a lesser extent, of Microsoft, and it seems likely that for both operating system vendors, the ideal situation would be one where their users could only install software (including games) through their own authenticated systems. And when your own app ecosystem is dependent on someone else's operating system, what can you do?

The perfect storm of a new generation of games consoles and the dawn of more restrictive and less



SteamOS isn't about improved performance, as there's very little difference. It's about controlling the ecosystem and competing with Sony, Microsoft and Apple.



competitive third-party publishing on Windows and OS X and forced Valve to come up with a dramatic change in direction. Until then, Linux hadn't been part of its history. But Valve's future, and potentially the future of PC gaming itself, is now dependent on what was an outsider and an underdog: Linux.

Steam client

The first whiff of Valve's changing direction came in early 2012. Some users reported that their Windows and OS X Steam clients included references to a non-existent Linux port, along with a few vague configuration files for the game Left 4 Dead 2. Most people cast these Linux appearances aside, as the rumours used to surface every few years regardless of fact. And until that point, the popular consensus had been that without obvious desktop growth, there was little advantage in a Linux port and only potential pain for Valve when it attempted to troubleshoot 200 different Linux distributions.

But those original rumours were confirmed on 16 July 2012, when Valve wrote a blog post called 'Steam'd Penguins'. It was used to straighten out the rumours, announce an 11-strong Linux Team (initially formed in 2011), and to finally confirm that they were working on both a Steam client and a port of Valve's Source games engine. Left 4 Dead 2 would be the first game. The blog also explained that Gabe had been interested in creating Linux versions for some time and that after conversations in the hallway sometime in 2011 those conversations led to the creation of a new team.

Valve has a rather unusual employee hierarchy because there isn't one. It describes this arrangement as a 'flat organisation' where employees don't report to anyone and are free to choose to work on whatever projects they think are interesting. In answer to the question "Why do I need to pick my own projects?" in the infamously leaked 2012 'Handbook for New Employees', the answer simply states "We've heard that other companies have people allocate a percentage of their time to self-directed projects. At Valve, that percentage is 100." Even Gabe Newell is himself described as follows in the handbook's glossary, "Of all the people at this company who aren't

The latest update to the Steam client includes game streaming for everyone and less OpenGL lag.



Steam and Linux are spreading the excellent Sir You Are Being Hunted across the world. Good show!

your boss, Gabe is the MOST not your boss, if you get what we're saying."

We'd imagine there was a constant background noise of Linux chatter at Valve. They already used it for their servers, and Gabe was probably vocal about where he wanted the company to go. At some point, the chatter resulted in a critical mass of opinion, and employees started pushing their desks together to create a new product, which became the Linux version of the Steam client. This *ad-hoc* formation eventually led to more resources and to the the 1,700 responses that appeared in the comments thread to the original blog post.

The Linux community were understandably very receptive to the idea that their operating system would finally be receiving a little premiere league gaming love. Many of us thought that the prospect of Steam finally coming to Linux was the last key in the puzzle and one of the last stumbling blocks for any operating system that wanted to consider itself as a

mainstream alternative to the proprietary alternatives of OS X and Windows. That blog post also outlined that initial support was going to be for Ubuntu only, which we all understood, because you don't want to deflect valuable resources from making a port to working out whether broken audio on Arch is down to ALSA, PulseAudio or OSS.

All hail the new gaming overlords

By December 2012, there was an open beta version of the Linux client, and while there were very few games – around 30 initially and growing to 50 by the time of the first official release in February 2013, Valve was having an effect on independent games developers. Many had started to consider creating a Linux port, as long as their cross-platform tools were able. But over the following summer, there was something more significant brewing. In the shadow of new console announcements from Sony and Microsoft, it seemed likely to most of us that Valve would attempt to enter the console market, and that perhaps its recent Linux manoeuvring would form part of a bigger plan.

The news eventually came in two slices at the end of September. The first was the announcement of SteamOS – a Debian-based cut-down Linux distribution that boots directly into a new Steam interface, and the second was an open hardware specification that it called the Steam Machine, along with a revolutionary controller. Unlike games consoles, there are going to be several different tiers for Steam Machines, and different manufacturers – some of which have already built and sold gaming PCs under the brand name. This means people can choose a specification according to their budget and gaming requirements, and even upgrade their own hardware.

Valve followed the hardware announcements with a lottery to send optimised prototypes of their own specification to 300 lucky Steam users. This was undoubtedly used by Valve to test their burgeoning Linux operating system, its Steam front-end and its hardware, drivers and update mechanism, a process that's still very much on-going. The launch of SteamOS and the promise of a new hardware platform was all that was needed for many major companies to start including Linux in their tier 1 gaming plans. Both Unreal Engine 4 and Unity 4 delivered Linux support, something which looked unlikely before Steam on Linux, and they're both making cross platform development much more viable for many developers. And with the prospects of Valve's Half Life Episode 3, a massively anticipated gaming title, coming to Linux on day-one, so too are other major studios considering Linux. There are now more than 431 Linux titles on Steam with more announcements than we can keep up with. More than the hardware and the software, this is what Valve has brought to Linux - a very real opportunity to create the best possible PC-based open gaming platform, which to many of us who love gaming, seems like a dream come true.

MOST POPULAR	PERCENTAGE CHANGE	
	0.00%	0.00%
Ubuntu 13.10 64 bit	18.87%	-8.58%
Ubuntu 14.04 LTS 64 bit	16.17%	+16.17%
Ubuntu 12.04.4 LTS 64 bit	9.01%	-2.11%
Linux Mint 16 Petra 64 bit	6.75%	-0.85%
Linux 3.10 64 bit	6.59%	-0.56%
Ubuntu 13.10	3.84%	-1.60%
Other	38.78%	+1.53%
3 GB	19.76%	+0.96%
GenuineIntel	76.56%	+0.23%
2.3 Ghz to 2.69 Ghz	23.92%	+0.75%
3.3 Ghz to 3.69 Ghz	5.00%	+0.30%
2 cpus	49.30%	+0.19%
Intel HD Graphics 4000	6.60%	+0.45%

Steam Linux usage is still hovering around 1%, but there are many major titles in the pipeline and we've yet to see cheap Steam Boxes to compete with the PS4 and Xbox One.

Installing SteamOS

It might be a moving target, but if you've got the luxury of a dedicated games machine, it's worth installing SteamOS onto a spare partition.


We'd recommend grabbing the ISO version of SteamOS. This is a 4GB file that can be downloaded from <http://repo.steampowered.com/download/SteamOSDVD.iso>. You then have the choice of either burning the ISO to a DVD, if your Steam PC is capable of booting from one, or transferring the contents of the ISO to a suitably large USB stick. The latter doesn't require any ISO conversion, such as with the UNetbootin tool, and the data can be written directly to the USB stick. The simplest method is `sudo dd bs=1M if=/path/to/dvd.iso of=/dev/sdX`, but you need to make sure that `/dev/sdX` is definitely your USB stick, as if you get this wrong, all your data will be overwritten. We'd suggest checking your system logs after inserting the device to make sure you get the correct device name. Before rebooting, we'd also recommend creating the SteamOS partition on your drives with a tool like GParted, as it's easier than doing the same thing through the SteamOS installer.

After rebooting, press the hotkey to open your system boot menu (usually F12). If you want SteamOS to be bootable from UEFI, make sure you boot into UEFI for your chosen boot method. If you want old-school BIOS booting, don't select a UEFI boot mode. Either way, the same SteamOS boot menu will then appear. Choose Expert Install from this menu, unless you want to give SteamOS complete control over your system. Then select a language, a location and a keymap. A few moments later, you'll see the 'Partition Disks' window. On our system, SteamOS had arbitrarily selected and suggested repartitioning our first drive, which is bad. Click on 'Go Back' and select the Partitioner again to remove any default choices. You'll then be able to double-click on your preferred

partitions. Change 'Use As' to 'Ext4', the 'Mount point' to '/' and enable the boot flag for your root partition. Click on 'Done Setting Up The Partition' to go back to the list and make sure only those partitions you're going to use are marked with a 'K' and an 'f' or 'F'. This is important, because the installer could change a drive you want to keep. When you're happy, click on 'Finish Partitioning And Write Changes To Disk'.

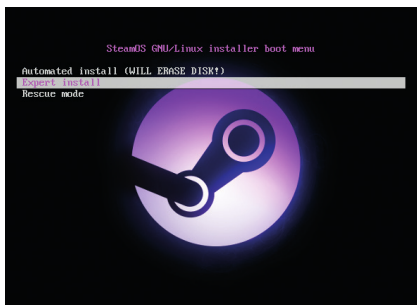
The base system will now be installed according to your wishes, and you'll get the chance to install the Debian desktop environment and the standard system utilities before the installer finishes, which we'd recommend for greater post-install flexibility.

After one more question your system will be rebooted, and with a bit of luck, you'll soon be presented with the SteamOS Grub bootloader menu, from which you'll be able to select SteamOS.

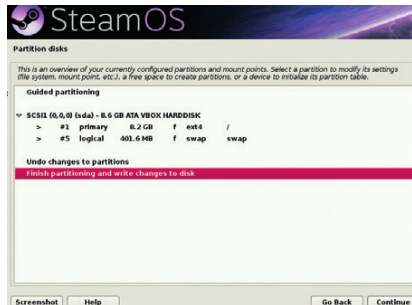
SteamOS should launch automatically, and on your first boot you'll first need to choose a language, agree to a EULA, change the screen configuration and your time zone. You can now use your Steam account details to log in and as with any other Steam client, you'll have to enter an activation code sent to your email address first. After the activation, you'll find yourself in SteamOS proper, complete with New Age background music and motes of OpenGL particles. While waiting for the official Steam controller, we'd recommend using Microsoft's Xbox 360 controller or Logitech's F310, as these work without any need to reconfigure the buttons. 

"You'll get the chance to install the Debian desktop environment and standard system utilities."

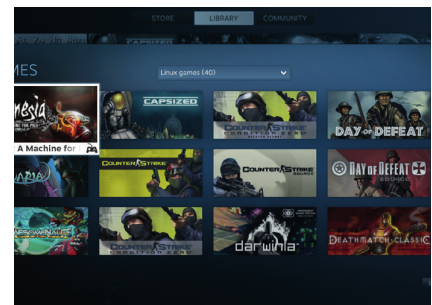
Install SteamOS from ISO



1 Boot it up
Burn the ISO to a DVD or copy it across to a 8GB USB stick. Boot from either UEFI or BIOS mode - SteamOS will now work with both. Choose Expert mode from the boot menu.



2 Partitioning
SteamOS recognises if a drive is empty and makes best use of it. Otherwise, be careful with its default configuration and make sure it doesn't overwrite your data.



3 Sign in
When it's up and running, validate your account and start downloading your games library. All Steam games are available to all clients, plus you can stream and share with family members.