A few months ago I decided it was time to replace my old laptop. It is an Acer Aspire 1302 series, with AMD AthlonXP @ 1.6 GHz, 512 MB RAM and 20 GB hard disk. As I wrote in the previous article about openSuSE 11.1, this machine is now so deprecated compared to today's mini netbooks, that searching the net for "Acer Aspire 1300" returns almost entirely shops for battery replacements. It's true, the main problem with old laptops like this is finding a "live" battery, so that it runs as a real "moving" laptop and not pugged into a power socket all the time. Of course, The second major problem is that, if someone wants to be up-to-date in some serious programming (or other) suite, every new software version renders the machine slower and slower...and slower.....and slower.....

Until now, my laptop used to "struggle" under Windows XP Home SP2. I had the chance to get a spare hard disk exactly as the one bundled with this model and I decided it was time to put the current disk away as-is and try something entirely new from scratch with the new disk, something more efficient and lightweight. I had already tried several live-CD distributions (primarily Linux) and most of them they ran smoothly, despite the tight fit into 512MB of RAM.

Choices, distributions and installation options

My first choice was Ubuntu, as most of the people, but I quickly turned into openSuSE, primarily due to the superb package administrator (YaST) and the build-in tendency to support software development and mid-user requirements, while keeping the maintenance time very low.

The two major choices in openSuSE are:

1. choose 32-bit or 64-bit version
2. choose KDE or GNOME as the X Window system

For the first option, choosing 64-bit over 32-bit is primarily a matter of hardware resources available, primarily RAM (needs a bit more) and CPU architecture. Obviously, in this situation the only option was 32-bit, since the AthlonXP is not a native 64-bit processor. The second major issue regarding 64-bit OS is whether the current and any legacy applications needed actually run as expected in a native 64-bit environment - it is a real disappointment having to run 90% of everyday's work in 32-bit emulation mode, even without any serious problems.

The second choice between KDE and GNOME is a bit tricky. Most people tend to favor one over the other in the most definitive way, but the truth is that both systems are exceptionally well-designed and well-coded. With openSuSE 11.1, both options were available, so I had to test them with the appropriate live-CD. Remember, on this particular laptop, every saving in RAM and/or processor load on idle becomes a major issue. The preliminary experimentation showed that KDE 4.1, whipped with openSuSE 11.1, was much more lightweight in terms of processor load on idle, roughly 7-9% compared to 20%+ with GNOME, so the choice was again obvious.

So, after a couple of hours, a minor crash & recovery during the first boot and a few adjustments to the KDE for low graphics settings, the 10-year laptop was as good as new with openSuSE 11.1 (32-bit of course), with more than 75% of the disk space available and a completely new suite of tools and packages, including OpenOffice, Firefox, Matlab, LyX and many more.

{rokbox thumb=|images/stories/suse11_sysinfo_setupfinished_20090630_thumb.png| title=|Knoppix 6.0.1 up and running :: It's true, 32-bit distribution installed and running smoothly on a 10-year laptop, less than 6 GB on hard disk (system+swap), with only 512 MB RAM and AMD AthlonXP @ 1.6 GHz |
}images/stories/suse11_sysinfo_setupfinished_20090630.png{/rokbox}

Further investigation

Naturally, I couldn't afford the space nor time to experiment with many more Linux distributions with full installation (on hard disk) on this laptop. However, was very interested to see whether the openSuSE option was indeed the appropriate one in this case, primarily in terms of lightweight desktop manager and processor & memory load. A few weeks ago openSuSE 11.2 with KDE 4.3 was available, with many enhancements, built-in Firefox and Thunderbird support, updated OpenOffice and many more. But before I upgrade the system to the new version, I decided to take a closer look to any other Linux distributions and compare as many live-CDs as I could find.

The comparison is simple, not extremely technical but very intuitive, since this laptop's hardware is very appropriate for testing backward compatibility and support, as well as a quick "stress testing" for a simple user's requirements:

1. total boot-up time
2. memory load after boot

3. processor load on idle
4. general responsiveness of the system

All the tests were conducted simply by booting up with the appropriate live-CD (desktop versions) and working with the OS for a few minutes, nothing too technical or any special monitoring. If the target is a typical low-end user, this is what he/she will see when first working with every fully-working Linux system.

Distributions that worked (other than openSuSE)

Knoppix 6.0.1

This distribution is a special case in these tests, since it's the only one booting up with a very lightweight X Window manager. Specifically, the Lightweight X11 Window Desktop is used instead of KDE or GNOME, with very limited support for system monitoring included in the live-CD. Therefore, there is no detailed data for memory load.

1. total boot-up time: **FAST**
2. memory load after boot: (**low**)
3. processor load on idle: (**low**)
4. general responsiveness of the system: **VERY GOOD**

{rokbox thumb=|../images/OS_screenshots/thumb_Knoppix_6.0.1_LightwX11desktop.jpg| title=|Knoppix 6.0.1 up and running :: Knoppix 6.0.1 up and running on Acer Aspire 1300 series laptop, with only 512 MB RAM and AMD AthlonXP @ 1.6 GHz | }../images/OS_screenshots/Knoppix_6.0.1_LightwX11desktop.jpg{/rokbox}

Mandriva 2009.1

The Mandriva clone is one of the most respected and commonly used Linux distributions today. It comes with the KDE manager and a wide range of applications and packages in the default installation. However, running the live-CD in this particular hardware was extremely painful, since it took more than 10 minutes to boot and 15 minutes to shutdown, after crashing the KDE several times when trying to open heavyweight applications like the OpenOffice. Typical memory load is about 193 MB but processor load on idle is extremely high at 42%.

1. total boot-up time: **VERY SLOW**
2. memory load after boot: **193 MB (OK)**
3. processor load on idle: **42% (VERY HIGH)**

4. general responsiveness of the system: **VERY BAD**

{rokbox thumb=|../images/OS_screenshots/thumb_mandriva_2009.1_KDE.jpg| title=|Mandriva 2009.1 up and running :: Mandriva 2009.1 up and running on Acer Aspire 1300 series laptop, with only 512 MB RAM and AMD AthlonXP @ 1.6 GHz |
}../images/OS_screenshots/mandriva_2009.1_KDE.jpg{/rokbox}

OpenSolaris 2008.11

The OpenSolaris is the open-source clone of Sun's Solaris (free edition). Typically, it's not Linux at all, but the comparison is valid for someone who wants just to take a good look on any Unix-like alternatives available as a live-CD, because the typical low-end user might as well choose this one over any other if it suits his/hers everyday needs (office applications, e-mail, web browsing, contacts). The 2008.11 distribution comes with GNOME and visually is more or less the same as every other Ubuntu-like variant. Processor load on idle is exceptionally low for a GNOME system at less than 15%, but memory load is very high at 420 MB.

1. total boot-up time: **OK**
2. memory load after boot: **420 MB (HIGH)**
3. processor load on idle: **15% (LOW)**
4. general responsiveness of the system: **GOOD**

{rokbox thumb=|../images/OS_screenshots/thumb_opensolaris_2008.11_GNOME.jpg| title=|OpenSolaris 2008.11 up and running :: OpenSolaris 2008.11 up and running on Acer Aspire 1300 series laptop, with only 512 MB RAM and AMD AthlonXP @ 1.6 GHz |
}../images/OS_screenshots/opensolaris_2008.11_GNOME.jpg{/rokbox}

PClinuxOS 2009.2

The PClinux-OS clone is one of the most stable and feature-rich Linux distributions today, however not many people seem to use it in practice. It comes with the KDE manager and a wide range of applications and packages in the default installation. Processor load on idle is exceptionally low for a KDE system at about 12%, but memory load is very high at 455 MB.

1. total boot-up time: **OK**
2. memory load after boot: **455 MB (HIGH)**
3. processor load on idle: **12% (VERY LOW)**
4. general responsiveness of the system: **GOOD**

{rokbox thumb=|../images/OS_screenshots/thumb_PClinuxOS_2009.2_KDE.jpg| title=|PClinux-OS 2009.2 up and running :: PClinux-OS 2009.2 up and running smoothly on on Acer Aspire 1300 series laptop, with only 512 MB RAM and AMD AthlonXP @ 1.6 GHz | }../images/OS_screenshots/PClinuxOS_2009.2_KDE.jpg{/rokbox}

Ubuntu 9.10

The Ubuntu clone is perhaps the most commonly used Linux distribution today,featuring various options for desktop or server editions, GNMOE or KDE (Kubuntu) or even lightweight X Window managers (Xfce), as well as supplementary packages for educational deployment (Edubuntu). Since it is a very close comparison to openSuSE, this test was conducted using only the desktop/GNOME live-CD. Memory load on idle was low at 166 MB but processor load on idle is exceptionally high at about 50%, which means that version 9.10 is probably too heavy for deployment in legacy hardware.

1. total boot-up time: **OK**
2. memory load after boot: **166 MB (LOW)**
3. processor load on idle: **50% (VERY HIGH)**
4. general responsiveness of the system: **GOOD**

{rokbox thumb=|../images/OS_screenshots/thumb_ubuntu_9.10_GNOME.jpg| title=|Ubuntu 9.10 up and running :: Ubuntu 9.10 up and running smoothly on on Acer Aspire 1300 series laptop, with only 512 MB RAM and AMD AthlonXP @ 1.6 GHz | }../images/OS_screenshots/ubuntu_9.10_GNOME.jpg{/rokbox}

openSuSE 11.2

As mentioned earlier, openSuSE was my first choice since the 11.1 version for various reasons, primarily the exceptional package administration tool (YaST) and the small fingerprint of the system with either KDE or GNOME. For correct comparison, the laptop was booted with a live-CD, despite the fact that a fully working installation was already in the hard disk. Memory load on idle was low at 177 MB but processor load on idle is high at about 38%.

1. total boot-up time: **OK**
2. memory load after boot: **177 MB (LOW)**
3. processor load on idle: **38% (HIGH)**
4. general responsiveness of the system: **GOOD**

{rokbox thumb=|../images/OS_screenshots/thumb_suse11.2_liveCD_snapshot1.jpg| title=|openSuSE 11.2 up and running :: openSuSE 11.2 up and running smoothly on on Acer Aspire 1300 series laptop, with only 512 MB RAM and AMD AthlonXP @ 1.6 GHz | }../images/OS_screenshots/suse11.2_liveCD_snapshot1.jpg{/rokbox}

Distributions that did not work or not tested at all

Solaris Express 1.08

This was the original choice over the OpenSolaris that was used instead. It is not a Linux, but it has many similarities and could be used under the same circumstances. However, the live-CD repeatedly refused to boot up due to hardware issues (not recognized). The problem can probably be fixed with a little "tailoring", but this was not the typical situation in this series of tests (sorry Sun, you're out).

Fedora 11

Fedora is a common alternative between Mandriva and Knoppix when a typical, general-purpose Linux is required and, for some reason, Ubuntu is not a valid choice (e.g. too heavy). However, as in the case with Solaris Express, the live-CD repeatedly refused to boot up properly due to hardware issues (not recognized). The problem can probably be fixed with a little "tailoring", but this was not the typical situation in this series of tests (disqualified).

Debian 5.0.2

Debian is considered the most stable and backwards-compatible Linux distribution. Unfortunately, there is no fully-capable live-CD distribution available and the ones that are indeed out there are not directly comparable to the live-CDs of the other distributions. Debian is intended to be used a dedicated OS with normal installation on hard disk, so no "alternative" testing was conducted here.

FreeBSD, OpenBSD, NetBSD

The BSD-like distributions is actually a completely different Unix platform, as in the case of Solaris. The FreeBSD is exceptionally well-written and it is perhaps the most advanced freeware Unix platform available, since the latest version implements even SMP for multi-processor platforms. As in the case of Debian, for BSD there is no fully-capable live-CD distribution available and the ones that are indeed out there are not directly comparable to the live-CDs of the other distributions. BSD is intended to be used a dedicated OS with normal installation on hard disk, so no "alternative" testing was conducted here.

SCO Unix, Netware and others

Ok, this is a simple boot-up test, it's not a full-time job...

More into the openSuSE 11.2 case

Since openSuSE was my first choice, I decided to look more into it, testing various options and live-CDs to see if there are any serious differences. First of all, the upgrade from 11.1 to 11.2 was very simple, took about 40 minutes and minimal effort. Additionally, all the pre-configured applications, options and customizations were kept intact, including even the placement and settings of widgets on the taskbar. The new system was a bit more demanding on disk space, but many more applications and tools are included in the default distribution, so it was expected.

{rokbox
thumb=|../images/OS_screenshots/thumb_suse-11.2_sysinfo_setupfinished_20091113.jpg|
title=|openSuSE 11.2 up and running :: It's true, 32-bit distribution installed and running smoothly on a 10-year laptop, less than 8 GB on hard disk (system+swap), with only 512 MB RAM and AMD AthlonXP @ 1.6 GHz |
}../images/OS_screenshots/suse-11.2_sysinfo_setupfinished_20091113.jpg{/rokbox}

With the new installation on disk, the boot-up time is significantly faster than any live-CD (of course), while memory and processor load on idle drops to 169 MB (from 177 MB) and 25% (from 38%), respectively.

{rokbox thumb=|../images/OS_screenshots/thumb_suse112_kde4_idle-monitor_Nov09.jpg|
title=|openSuSE 11.2 up and running :: It's true, 32-bit distribution installed and running smoothly on a 10-year laptop, less than 8 GB on hard disk (system+swap), with only 512 MB RAM and AMD AthlonXP @ 1.6 GHz |
}../images/OS_screenshots/suse112_kde4_idle-monitor_Nov09.jpg{/rokbox}

In order to compare these figures to a more current system, I tried booting up a desktop PC with the 32-bit and 64-bit live-CDs of the same version, again with KDE. The target system this time had an Athlon64 processor at 3200+ (2.06 true) GHz and 2 GB RAM. The 32-bit option yielded memory load about 180 MB (as in the low-end laptop) but only 7% processor load on idle, as expected. Compared to that, the 64-bit option yielded a slightly higher memory load at 250 MB and processor load on idle at about 9%.

{rokbox
thumb=|../images/OS_screenshots/thumb_suse-11.2-32bit_idle_KDE4_Athlon64-2G.jpg|
title=|openSuSE 11.2 up and running :: 32-bit distribution running on a typical desktop PC with 2 GB RAM and AMD Athlon64 @ 3200+ (2.06 true) GHz |
}../images/OS_screenshots/suse-11.2-32bit_idle_KDE4_Athlon64-2G.jpg{/rokbox}

{rokbox
thumb=|../images/OS_screenshots/thumb_suse-11.2-64bit_idle_KDE4_Athlon64-2G.jpg|
title=|openSuSE 11.2 up and running :: 32-bit distribution running on a typical desktop PC with 2 GB RAM and AMD Athlon64 @ 3200+ (2.06 true) GHz |
}../images/OS_screenshots/suse-11.2-64bit_idle_KDE4_Athlon64-2G.jpg{/rokbox}

Accessing remote desktop via VNC

The final test was trying to connect the newly installed openSuSE 11.2 with a desktop PC running Windows XP SP2, using only standard tools and minimum to no configuration.

The remote desktop case was (unexpectedly) very easy. Using TinyVNC as client and server on WinXP, I was able to connect via VNC for remote desktop both ways, i.e., from WinXP to Linux and the other way around. VNC configuration via YaST in openSuSE is trivial, as long as the proper options are checked for opening the default ports through the firewall. An important point: the WinXP program should be configured NOT to open the connection both ways by default, otherwise the VNC server on openSuSE will refuse the connection. Except from some minor issues with broken window refreshes, all run smoothly and with no significant problems.

{rokbox
thumb=|../images/OS_screenshots/thumb_winxp_suse-11.2-sysinfo_VNC-from-WinXP_20091114.jpg| title=|openSuSE 11.2 up and running :: Accessing openSuSE 11.2 remote desktop via VNC from a typical Windows XP PC |
}../images/OS_screenshots/winxp_suse-11.2-sysinfo_VNC-from-WinXP_20091114.jpg{/rokbox}

The file sharing case is a bit more tricky. The openSuSE can be configured quite as easily as for remote desktop, which means that the only thing necessary is to point to the correct IP/name and shared folder name to the WinXP machine, in oder to see the shares in the Linux's file manager. Fr example, with Dolphin, creating a mapped network folder to the WinXP actually

reveals every other shared folder, although automatic display of share folders "by default" is a but difficult without a proper Windows domain server in the local network. On the other hand, accessing the Linux disk from WinXP is not so straightforward, since it requires the installation of Samba server. The process is quite easy with YaST (just select and configure form the main system's control panel) and the configuration of shares is very easy in Samba, but for some reason WinXp still refuse to cooperate and access them via mapped network drive. The problem can be solved usually by configuring access via FTP-only or by proper "coordination" of settings in both machines (e.g. firewalls), but the fact is that it needs some minor or more advanced tweaking - not recommended for a typical low-end user that needs true plug-n-play functionality.

A final word

If nothing else, this series of tests proved that Linux should not be considered an out-of-space option for novice users anymore. Almost all distributions are very stable, user-friendly and testable via live-CDs, while at the same time keeping the OS fingerprint really low - and of course the cost to zero. Some distributions, like FreeBSD, are exceptionally advanced and they are able to cover almost any heavyweight requirement for intense processing and scalability.

At the same time, most Linux distributions can really give a brand new breath of life to old PCs and legacy hardware that is now stored in boxes somewhere or sent to recycling every 2-3 years. It is very important to clearly convince the average user to at least give it a try, see what's out there, experiment with live-CDs and with open-source software in general, as a very modern and very reliable alternative.

Further info: distrowatch.com , linux.org , theosfiles.com , livecdlist.com , pclinuxos.com , opensolaris.com , mandriva.com , knoppix.com , ubuntu.com , opensuse.org