



PC Pitstop Research Reports

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Napster and the File-Sharing Revolution:

*Application Penetration and Effects on the PC
and Internet Community*

PC Pitstop Data Summary and Analysis
Copyright April 2001
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Napster and the File-Sharing Revolution

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Introduction

When PC Pitstop first started tracking Napster in April 2000, our analysts discovered that Napster represented a new paradigm in the way people interact on the Internet. Users were not only trading songs, but also thoughts, ideas and ambitions. And we watched as Napster grew and grew, creating an unprecedented impact on the PC and Internet community—and paving the path for scores of competitors and enhanced file-sharing applications.

While Napster's ultimate fate is still unclear, the March injunction that forced Napster to filter out copyrighted material from its service is certainly a setback to the file-sharing community. Nevertheless, as Napster scrambles to put these filters into place, it's clear that the app is here to stay—in some form or another. What's more, the concepts of Internet "disintermediation" that Napster has helped to plant are certainly alive and well in the dozens of alternate applications available to users.

With this in mind, PC Pitstop continues to track Napster and more than two dozen other file-sharing applications, carefully analyzing their impact on the PC and Internet industries.

In summary, while Napster installations were down in March 2001, it is clear that not only is file-sharing technology still growing, but it's driving market acceptance of high-end technology at a stunning rate. Napster PCs have consistently shown above-average acceptance rates, and PCs with file-sharing alternatives now show even *higher* rates.

**About
PC Pitstop Research**

PC Pitstop's research reports are free-of-charge and may be freely distributed. We encourage you to share this information with colleagues, technical staff and friends.

Also note that PC Pitstop research is unique and highly accurate due to our ability to collect data directly from Windows, and not simply via a telephone or marketing survey, which have high error rates. In addition, we are able to update our analyses every month, and currently collect more than 100,000 data points every month.

For the applications, this report tracks the following metrics: **overall install rates, install rates by home vs. work, average CPU clock speed, average Internet speed by ping times and bandwidth distribution, CD-RW and DVD install rates, average hard disk capacity, hard disk usage, installed RAM and top Napster OEMs.**

Methodology

The analysis in this report is based on data gathered from March 2000 through March 2001 (unless otherwise noted) at the PC Pitstop Web site. The number of PC configurations examined were as follows:

Year 2000

- March 11,419
- April 19,362
- May 47,302
- June 49,610
- July 51,785
- August 44,325
- September 45,482
- October 52,540
- November 63,650
- December 74,216

Year 2001

- January 103,726
- February 101,634
- March 109,963

The *percentage of PCs* cited throughout this report refers specifically to the percentage of PCs tested at PC Pitstop.

How the Site Works

The Pitstop methodology checks for the existence of each software application's executable (for example, Napster.exe) on the computer. See Appendix A for the complete list of EXE files tracked. We cannot tell whether a person is using any of the software regularly, only that it exists and hasn't been deleted from the drive.

About Our Data and Privacy

PC Pitstop looks at PCs, not people. We examine only the parameters necessary to perform a diagnostic on a PC, no more and no less. This includes disk capacity, disk

fragmentation, lost clusters, free disk space, number of partitions, RAM and so on. The information is stored in our databases. We do not look at user files, browser history, credit card information or anything else of a personal nature. We do not copy any information from the drive to our databases. In addition, we do not collect aggregate information, such as the number of documents in a folder or the number of megabytes in a particular folder.

We do not collect demographic information, and consequently, we offer no demographic research services. At PC Pitstop, the only user information collected is a username and e-mail address (both voluntary). Our only purpose is to aggregate PC information.

PC Pitstop is a fast-growing company, so our data sets are weighted heavily toward the current time. The law of large numbers dictates that our statistical accuracy is improving geometrically as you move closer to the current moment. For instance, note the sharp increase in PCs examined over the past year. The difference between March 2000 and 2001 represents a far greater statistical accuracy—as well as a much higher accuracy rating than other research firms (which typically collect only a few thousand data points). As we continue to add PCs to our testing database, the accuracy of our analysis will continue to grow.

In addition, it's important to note that the data and analysis presented here also serves as an example of the range of PC Pitstop's research capabilities. Because of PC Pitstop's unique ability to gather data directly from Windows—and from more than 100,000 PCs every month—we can produce a detailed analysis of nearly any Windows software, hardware or system metric, and cross-examine it by any other metric gathered in our database.

Data Representation

Because of the nature of the technology used by PC Pitstop (Internet, ActiveX), two factors qualify the data collected by the site:

1. All PCs are connected to the Internet.
2. All PCs are running Internet Explorer 4 or higher. (Note: The browser requirement does not necessarily mean that Netscape Navigator is not installed on a PC. Users very often run both browsers on a single system.)

Data Analysis

Installed Base

Figure 1 below indicates that Napster was installed on approximately 38 percent of the total PCs tested at PC Pitstop in March 2001, a 6% drop since February. It's the first drop

in install base in eight months, and it's certainly the result of the March injunction against Napster. What's more, it's an indication that users not only are using Napster less, but they're actually uninstalling the application as well. It'll be interesting to see how Napster's continuing efforts to filter out copyrighted titles from its service affect its user install base. We'll continue to monitor Napster in the coming months.

Napster Installed Base Trends

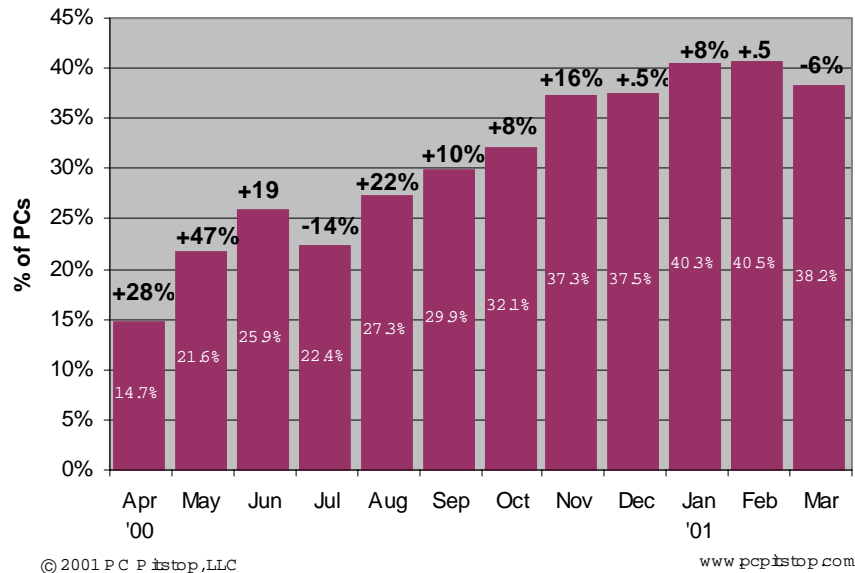


Figure 1

Napster's growth over the past year was certainly not surprising. With the amount of press it received, its popularity in universities and the wide-reaching appeal of the technology, Napster's installed base jumped ahead of even popular applications, such as Microsoft Works, Money, ICQ, Quicken and McAfee VirusScan. (The only exception was July 2000, when Metallica drummer Lars Ulrich produced a list of 300,000 Napster users, a move that certainly cautioned Napster usage. The growth rate also slowed somewhat in recent months as a ceiling grew on the number of people who had not yet discovered Napster.)

Nevertheless, the injunction has certainly slowed Napster's growth early on, and dozens of file-sharing competitors are now gaining momentum. Figure 2 below shows the most popular alternates and their growth rates.

Note the growth of the top-five most popular applications: mIRC, AudioGalaxy, BearShare, WinMX and LimeWire. Also note that the past year's most popular Napster competitors—Gnutella and Scour—both have declined in install rates over the past three months. While none of the competitor's install rates compare to Napster's, their growth

rates certainly are on the rise—an indication that users are now looking for file-sharing alternatives. PC Pitstop will continue to monitor the growth of these applications. As the leaders become clear, we will also analyze their ongoing effects on the PC and Internet industries.

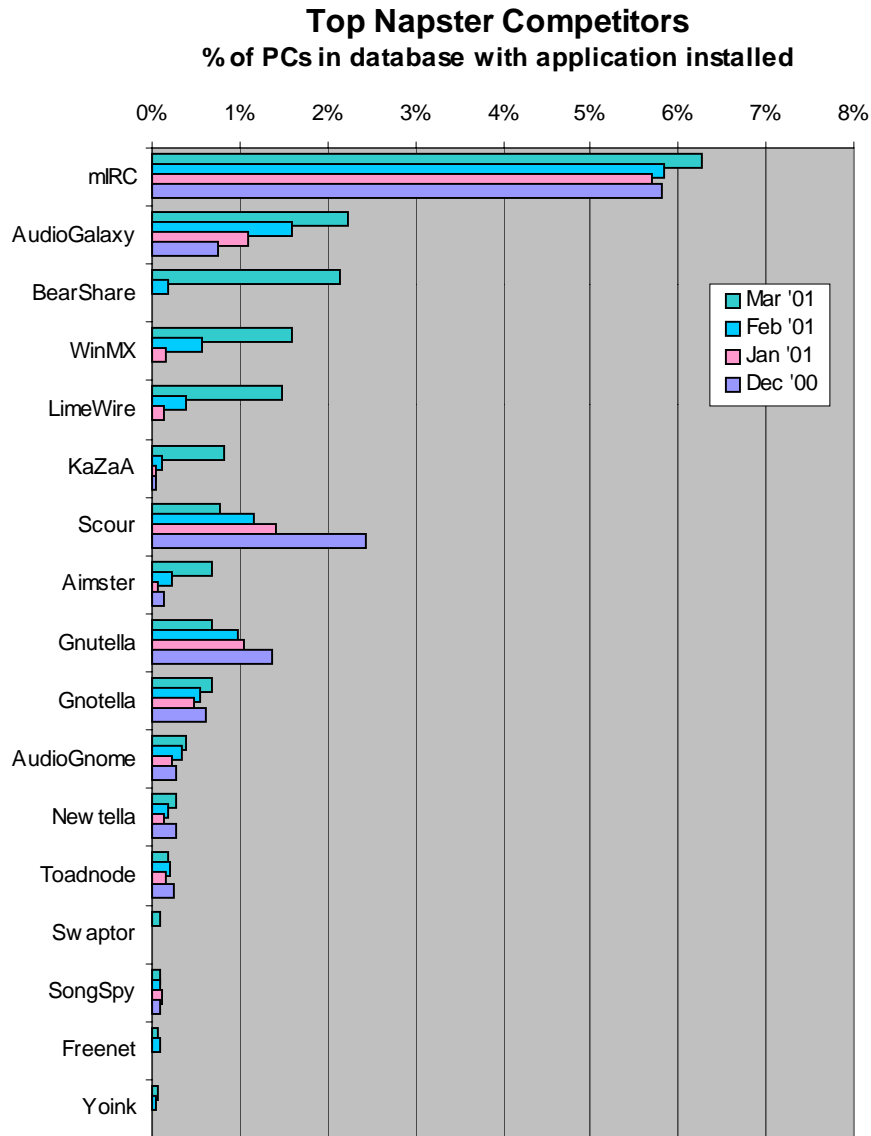


Figure 2

(Note: PC Pitstop also looked for the following applications, but their install rates were negligible and hence are not displayed in this chart: *Swapoo, OnShare, Napigator, FileNavigator, iMeshr, NetBrilliant, Raptigator, FileTopia*)

Figure 3 below provides a different look at the competing applications. For March 2001, it shows the percentages of PCs with an alternate installed that also have Napster installed. It also provides more evidence about how and where users are migrating. It's clear that users are uninstalling Napster in favor of the top-five most popular alternates.

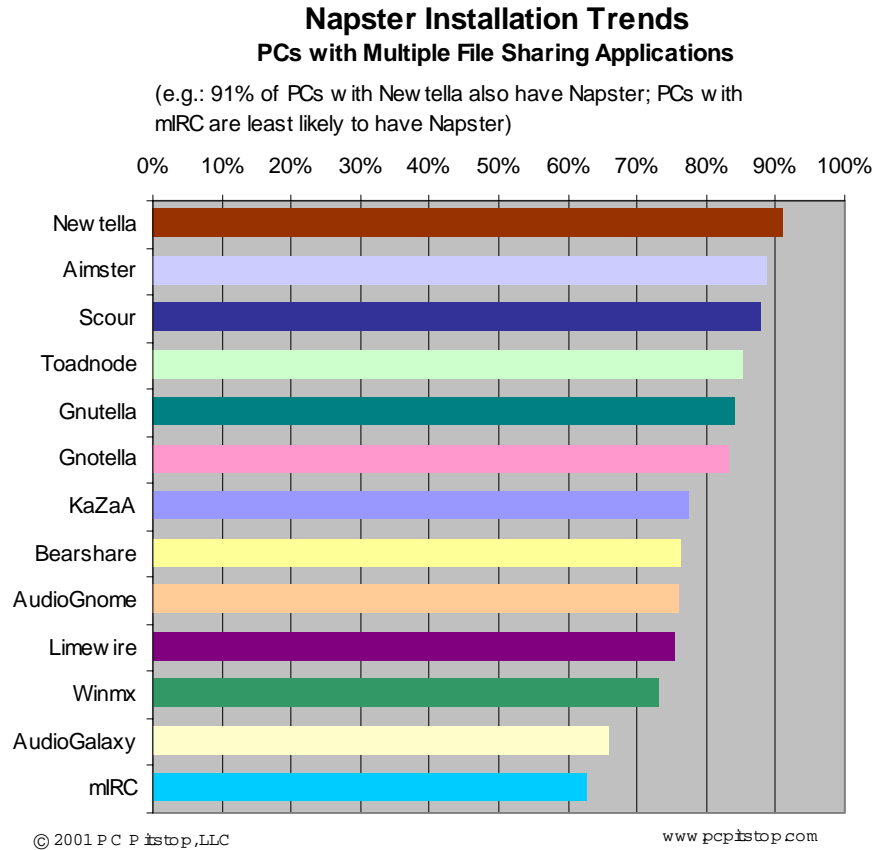


Figure 3

Napster Usage: Home Vs. Work

One of the metrics PC Pitstop gathers is an analysis of where a PC is used: at home, at work, at home and work, unknown (or NA). The analysis is based on a user questionnaire conducted at the end of the PC Pitstop tests.

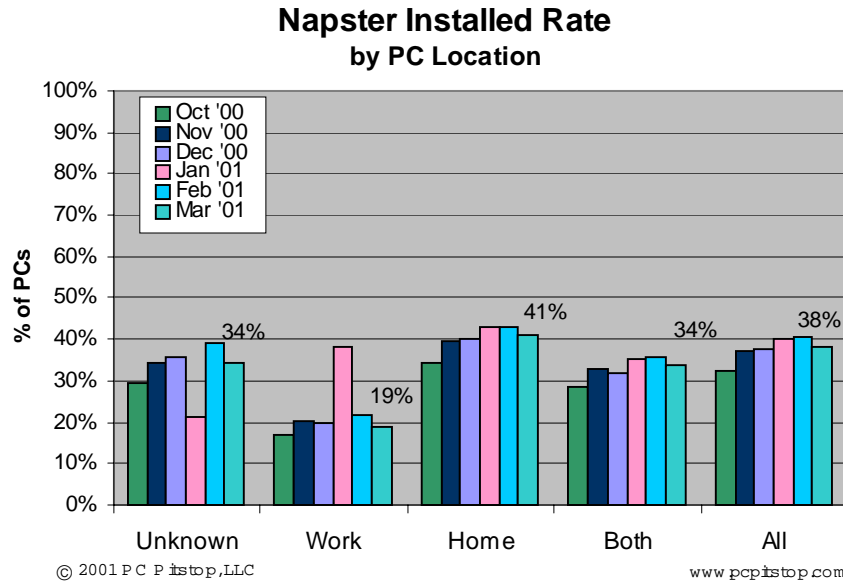


Figure 4

Our reports indicate that Napster was installed on about 41 percent of the home PCs examined. However, Napster also shows a significant penetration in the office PC segment as well: About 19 percent of the work PCs examined had Napster installed. What's more, about 34 percent of PCs used at both home and work had Napster installed. (Also note that about 34 percent of users answered "NA"—or unknown—for location).

We speculate that the reason for the strong showing in the work PC segment is due to the availability of higher bandwidth (broadband) connections in the office.

Napster Users Have Faster CPUs

PCs used to require a special codec (compression-decompression) chip to decode MPEG information. But with the growth in CPU clock speeds, virtually any PC today can easily decode MP3 audio. However, some PCs with clock speeds less than 200MHz may struggle with playing audio and performing other tasks simultaneously. This used to be called the hardware-software spiral: Software continually made more demands on hardware, which precipitated even higher levels of software, which in turn continually rendered many PCs in the installed base obsolete. This created the PC-industry magic words: upgrade cycle. Multimedia and the Internet were the two major consumer-related upgrade cycles in the 90s.

In Figure 5 below, note that the average clock speeds for all PCs over the past year progressively rose. Thanks to technology wars between AMD and Intel, we have seen a

huge escalation of clock speeds in the last year. (Note: In general, higher clock speeds represent newer PCs.)

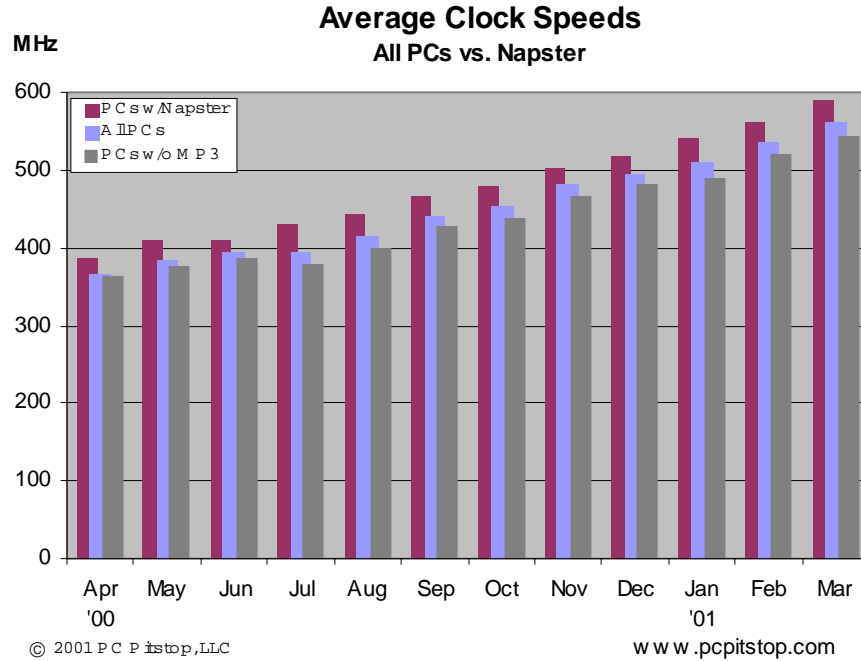


Figure 5

More importantly, file-sharing PCs are faster than average PCs. Over the past year, Napster PCs consistently maintained a higher clock speed than average PCs. What's more, PCs without any kind of MP3 utility consistently showed a below-average clock speed. Plus, the early data in Figure 6 below (for March 2001 only) shows that the most popular file-sharing alternatives rank even higher than Napster—a signal that the truly high-end file-sharing users are moving on to alternatives.

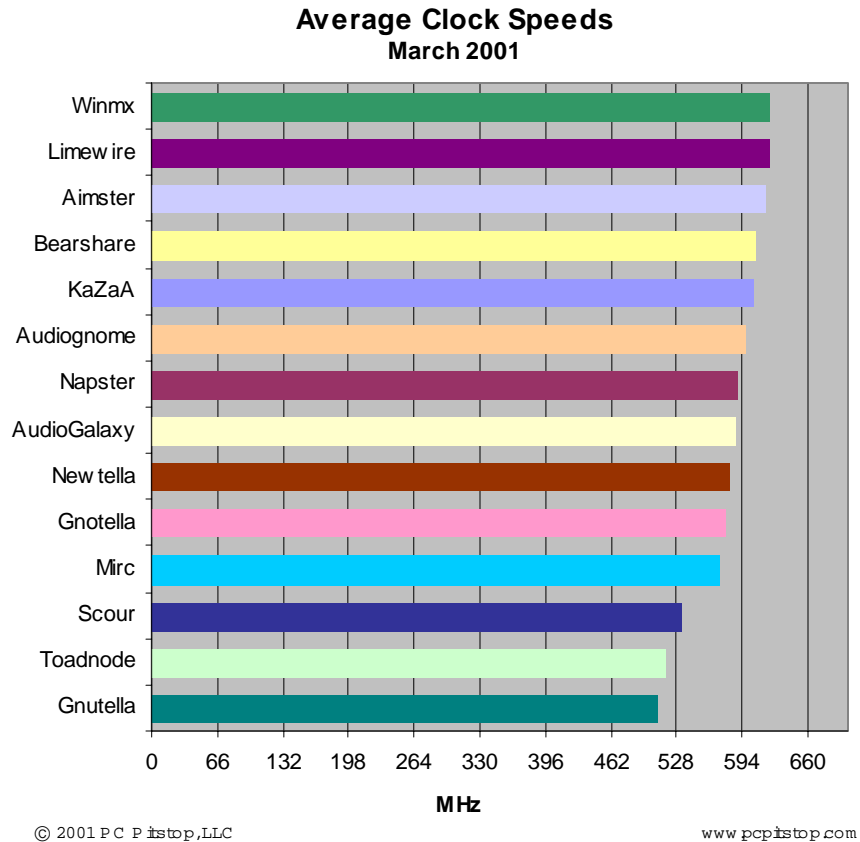


Figure 6

None of this is surprising, for two reasons. Some PCs that are able to browse the Internet are unable to adequately run MP3s. For example, it is still possible for users with a 486-class computer to browse the Internet, but they would be unable to have a reasonable experience with any file-sharing app. Secondly, Napster adoption began in universities, and it's probable that Napster usage is still skewed toward the university community. These PCs would also tend to be newer (and therefore faster in general) since they could not be much older than four years.

What's more, the higher jumps in clock speeds for file-sharing PCs in the past three months may be a signal that these technologies are indeed driving new PC sales. Bottom line: File-sharing PCs are faster and newer, and there is a definite gap between them and the average PC. Will this trend continue? Is it enough to drive an upgrade cycle? We'll continue to track all of these trends.

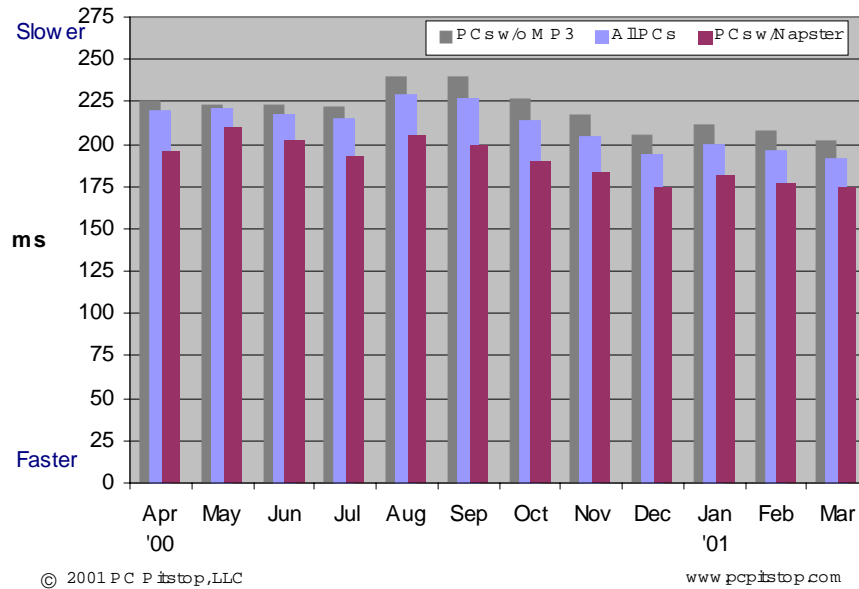
Internet Connection Speed

MP3s are fairly large files, usually somewhere between 2MB to 5MB. On a 56K modem, a file this size typically takes about 20 minutes. Of course, higher-speed alternatives are becoming more prevalent. DSL and cable modems promise to knock these downloads from 20 minutes to less than a minute. Overall, the adoption of these technologies has been rather slow. Can the file-sharing paradigm accelerate the adoption of these technologies as well?

At PC Pitstop, one of the many diagnostic measures we use is a ping test. The ping test measures the round trip time for a signal to travel from a server to the target PC and back again. The further a PC is from the server, the longer the ping time. For example, in pinging an East Coast site in the US, a cable modem PC in France could have the same ping time as a 56K modem PC in New York. Although there is a clear correlation between connection speed and ping time, it is only one measure of actual connection speed.

To gather this data PC Pitstop pings its own site five times and takes the average. Generally, lower ping times represent faster Internet connections. A ping time of less than 100 is considered outstanding and is usually a sign of a faster technology such as a cable modem or DSL. Ping times greater than 200 are very typical for a modem user in the United States. Ping times greater than 400 generally indicate a very remote user/site or a problem with an Internet connection.

Average Internet Speeds (Ping Time)
All PCs vs. Napster



(lower numbers are better)

Figure 7

In Figure 7, Internet connections on Napster PCs are faster than average PCs. Again, this is not entirely surprising, because of the bandwidth requirements of the Napster application.

Also, notice that ping times in general are steadily declining, and that in Figure 8 below the ping times for the majority of file-sharing alternatives were lower than Napster in March 2001. It's clear that file-sharing apps are driving demand for broadband access as their users junk their modems in favor of faster technologies.

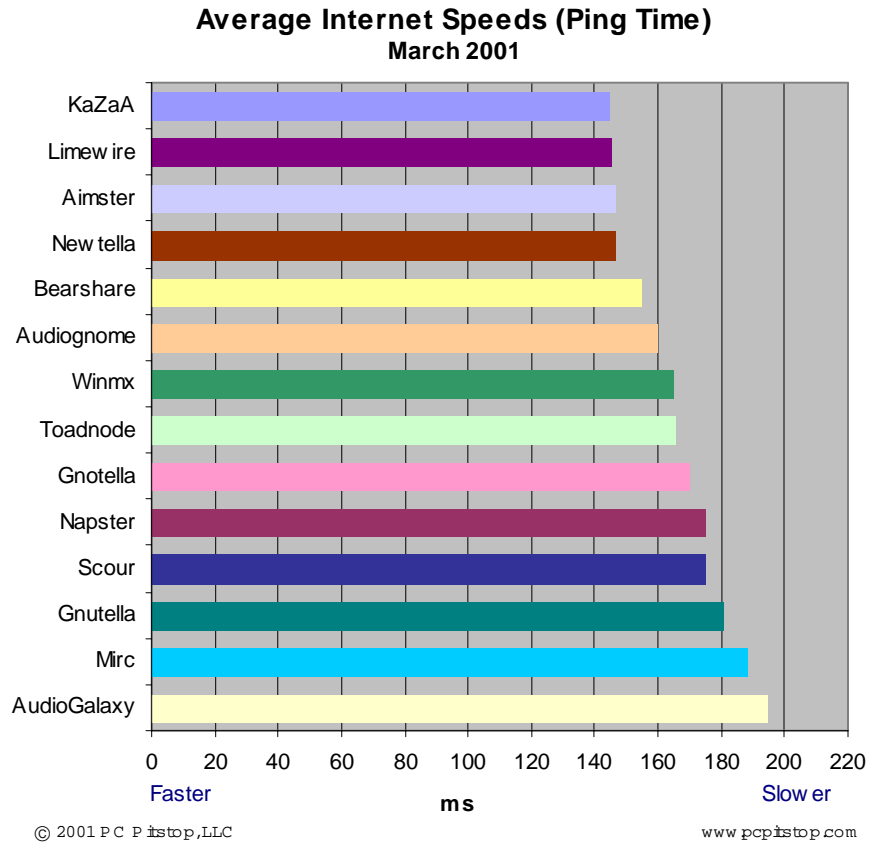


Figure 8

The second PC Pitstop measure of an Internet connection is a bandwidth test, which measures the transmission speed or throughput of a PC's connection to the Internet by downloading a block of random text. We've qualified the bandwidth results into two categories: low bandwidth and high bandwidth (i.e., broadband):

- Low bandwidth refers to connections 59Kbps or lower
- High bandwidth (broadband) refers to connections 60Kbps or higher

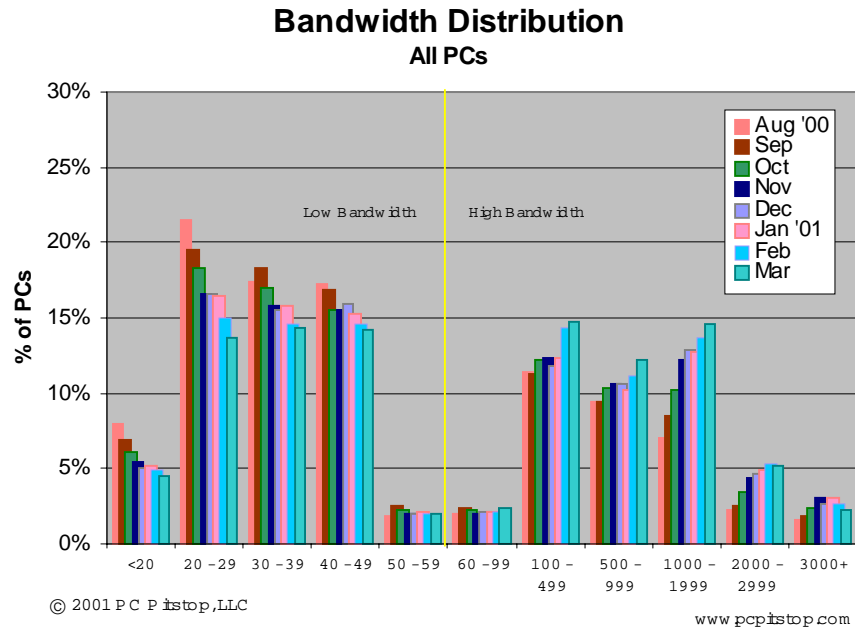


Figure 9

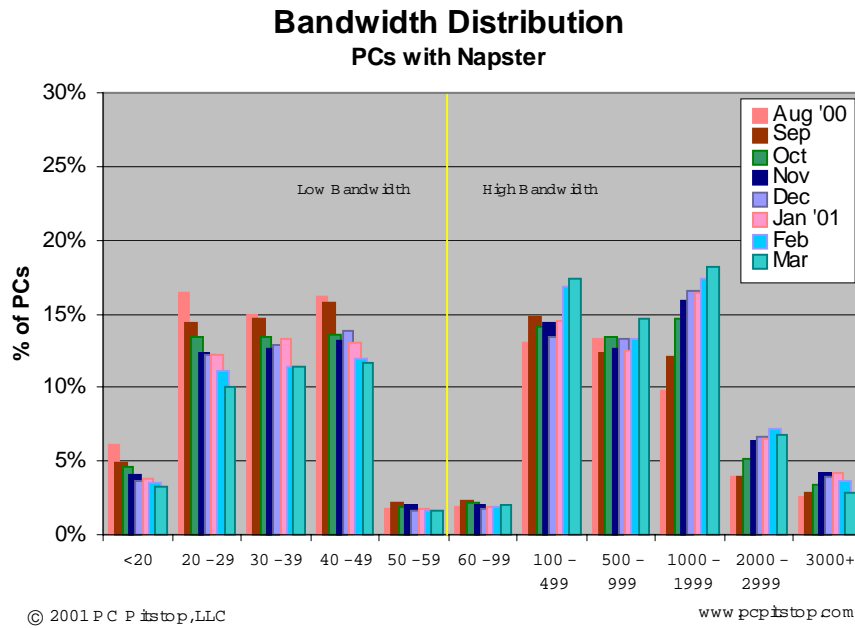


Figure 10

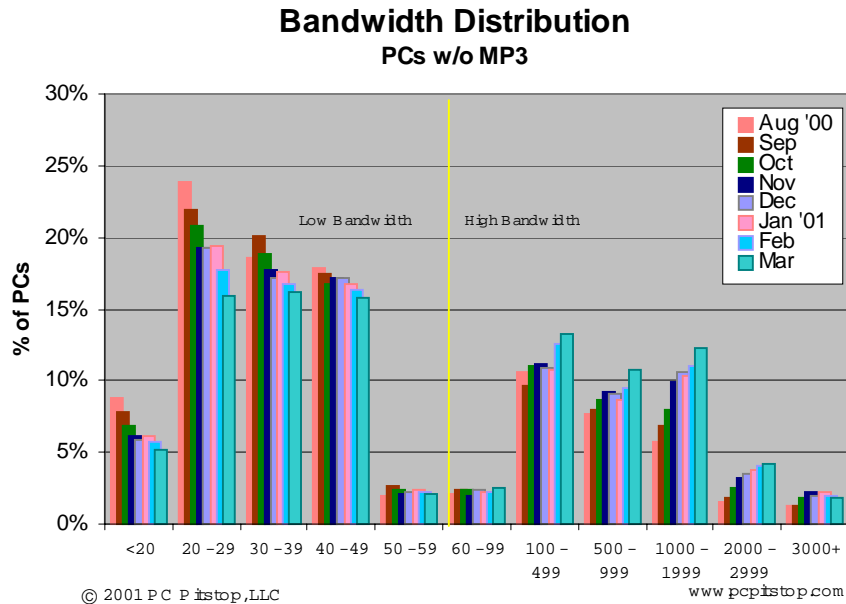


Figure 11

The results of our bandwidth tests are even more revealing than the ping tests. First, notice in Figure 9 that although the majority of the general PC population falls into the low bandwidth range, month-to-month trends show that low bandwidth distribution is steadily falling and that the high bandwidth distribution is rising. Given the increasing availability and cost-effectiveness of cable and DSL connections, we expect this trend to continue.

As expected, the distributions for high bandwidth on Napster PCs in specific are higher than the general population. Again, this is not surprising because of the high bandwidth requirements of file-sharing PCs. While low-bandwidth Napster PCs are still relatively prevalent (most likely due to Napster’s popularity), the trends nevertheless show a steady decrease in low bandwidth and an increase in high bandwidth.

Lastly, PCs without any kind of MP3-sharing software show an overwhelming distribution in the *low bandwidth* range and a dramatic falloff in the high bandwidth range—an indication that file-sharing technology is certainly supporting and driving the broadband market.

CD-RW and DVD Adoption

One of the most exciting technologies to come to the PC market is CD-RW. CD-RW is able to handle both types of removable media: CD-R and CD-RW. Both contain 640MB

of storage, but the CD-RW media is erasable. CD-R's strengths are many. CD-Rs are compatible with any audio CD player, and can also be played as an audio CD or data CD in every CD unit in every PC. Lastly, CD-R media is roughly about \$.50 when purchased in bulk. In this way, this multipurpose drive has the potential to expand the functionality of the PC while replacing traditional storage and backup devices such as the floppy, Zip drives and tape backups.

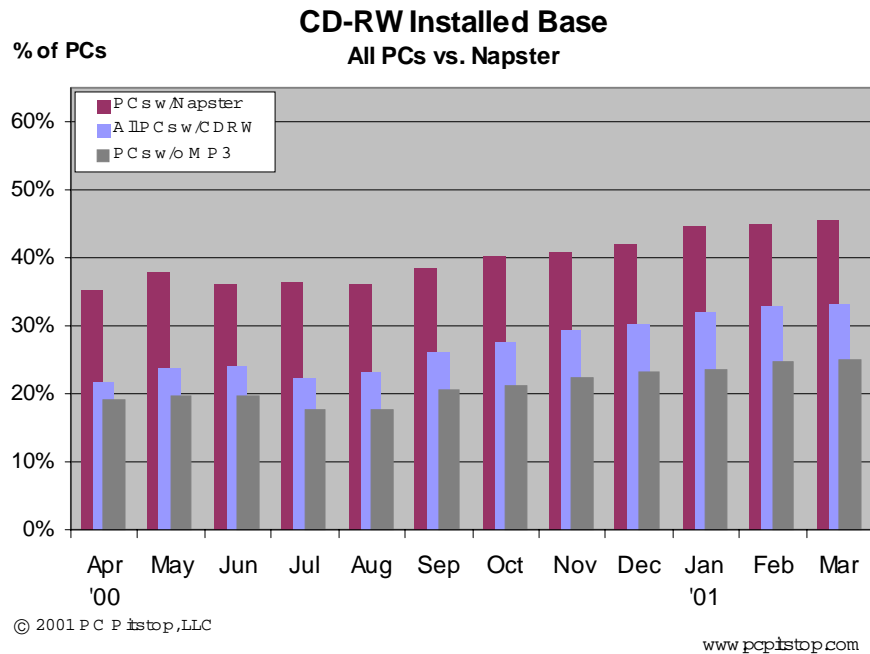


Figure 12

PC Pitstop checks Windows for the existence of a CD-RW device driver. It is possible to have a Windows driver without having the corresponding hardware, and conversely it is possible to have non-functioning hardware present, without a corresponding driver. Overall, CD-RW penetration is on the rise. The prices are declining, and more OEMs are including CD-RW as an option on new PCs. CD-RW is also becoming one of the more attractive upgrade options for older PCs. At the very least, a CD-RW can be used to quickly transfer all files from an older PC to a newer one.

Figure 12 shows that Napster PCs have consistently maintained a significant lead in CD-RW adoption, particularly when compared to CPU clock speeds. This result is not astonishing, since CD-RW adds a lot more value to a PC geared towards a multimedia enthusiast, instead of a PC not used for audio or video. What's more, the early data in Figure 13 below for March 2001 shows that the overwhelming majority of Napster alternatives are again even further ahead of the curve on technology adoption.

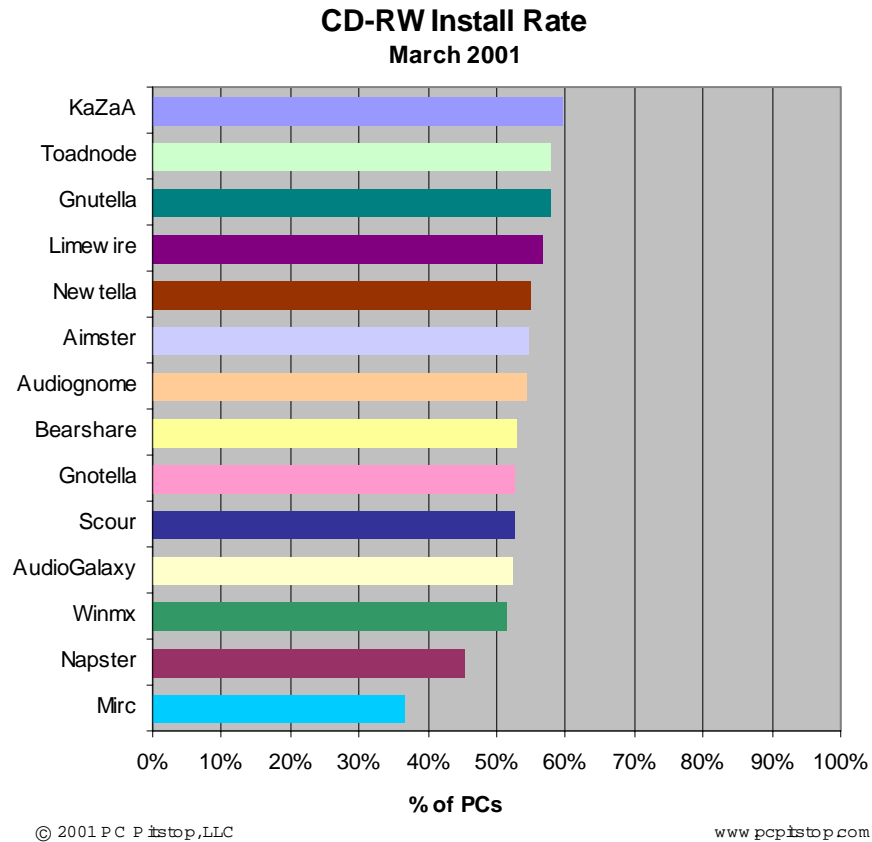


Figure 13

The most interesting fact is that overall adoption of CD-RW is only a little more than 30 percent. Also, notice the spike in hard drive capacity and usage during the 2000 holiday season in the hard disk analysis below. It's possible that this increase is due to new PCs purchased for the holiday season, but it's surprising that CD-RWs, given their advantages over hard drives for storage, did not see a spike as well.

But considering the utility of CD-RW, one would expect these numbers to consistently grow to close to 100 percent, and the overall rise in the percentage of file-sharing PCs with a CD-RW supports this. CD-RW vendors would do well to target file-sharing PCs as well as audio and video enthusiasts, since it appears that they are leading the adoption curve.

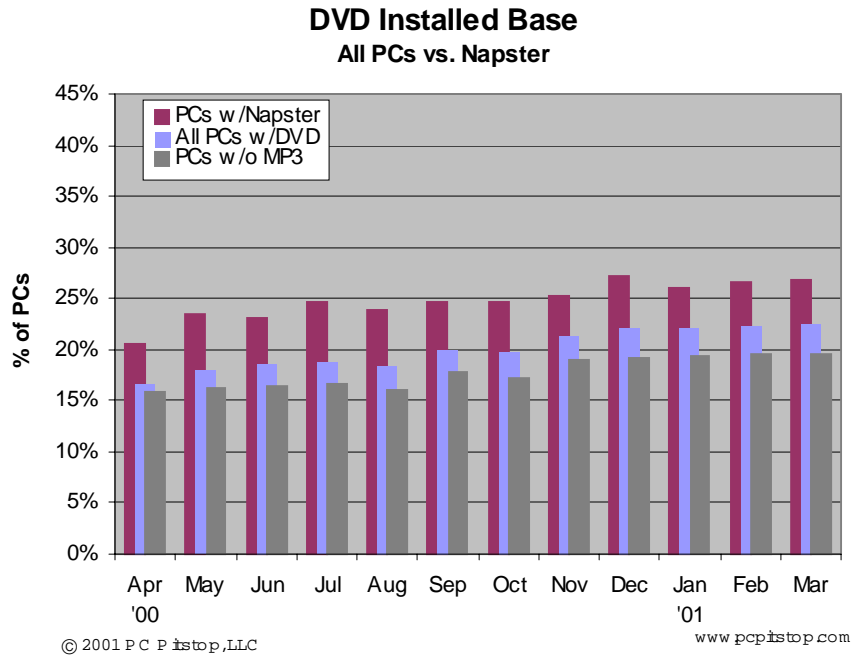


Figure 14

In addition, Figure 14 above shows that Napster customers are more likely to have DVD devices as well. And like CD-RW, PCs with the file-sharing alternatives showed even higher occurrence rates of DVD devices than did Napster PCs (see Figure 15 below).

The overall numbers aren't as striking as CD-RW, but this is not surprising. Given CD-RW's support for multiple storage formats, and especially its rewrite capability, we expect CD-RW to take the lead in removable storage overall—and consequently show a higher install base with file-sharing PCs. Nevertheless, notice the spike in December 2000 across all PCs. This may be the result of new PCs purchased for the holiday season.

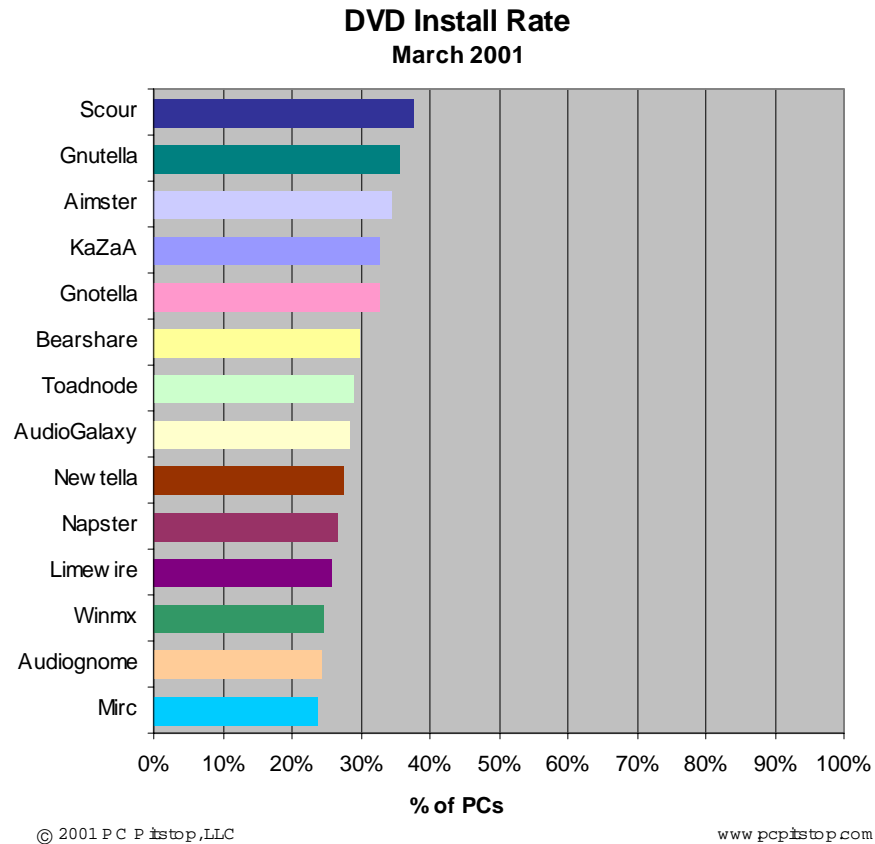


Figure 15

Disk Usage

The hard drive industry has been going through a very difficult time. In the early 90s, the industry embarked on a density war. Companies such as Seagate, Quantum and Western Digital, clawed tooth and nail to determine who could fit the most megabytes per drive. The strategy worked well for everyone since there was a huge appetite for hard drive capacity. But in the late 90s, demand for drive capacity abated as customers stored more information on the Internet and a whole new generation of customers consumed information, but did not create any. The industry desperately needs a new application that increases demand for hard drive capacity.

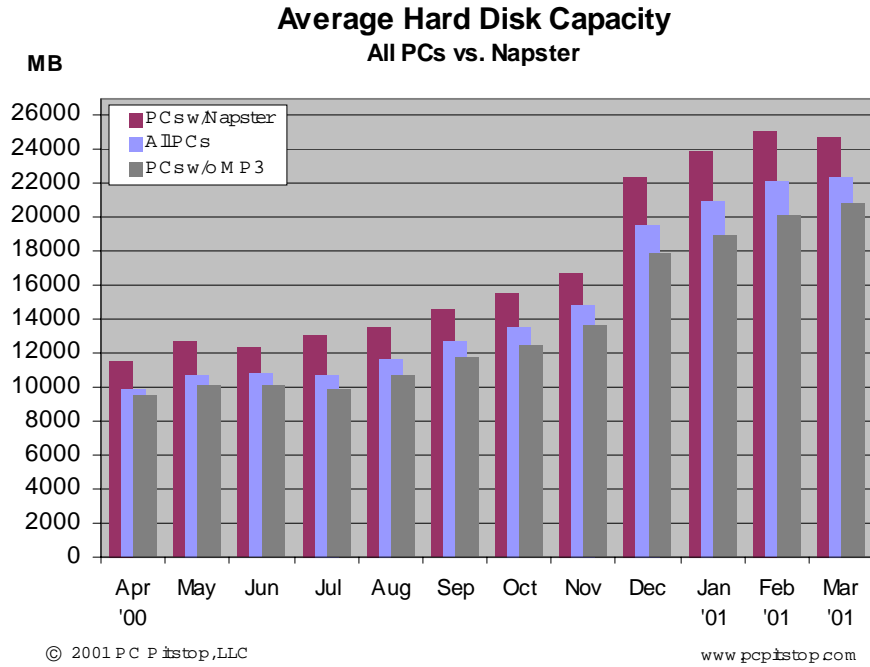


Figure 16

Figure 16 (above) and Figures 17 and 18 (below) are encouraging. Although it is possible that file-sharing PCs come with larger and less expensive drives simply because they are newer PCs, it's becoming clear that file-sharing technology is initiating a spike in demand for hard drive capacity—whether that's on new systems or through hard drive upgrades.

However, notice the decrease in hard disk capacity for Napster PCs in March. This could certainly be the result of the March injunction and users turning to Napster alternatives (which also allow the trading of video and image files, which in turn take up even more space). As expected, the hard disk capacity was greater in the majority of PCs with a file-sharing alternative installed (see Figure 17).

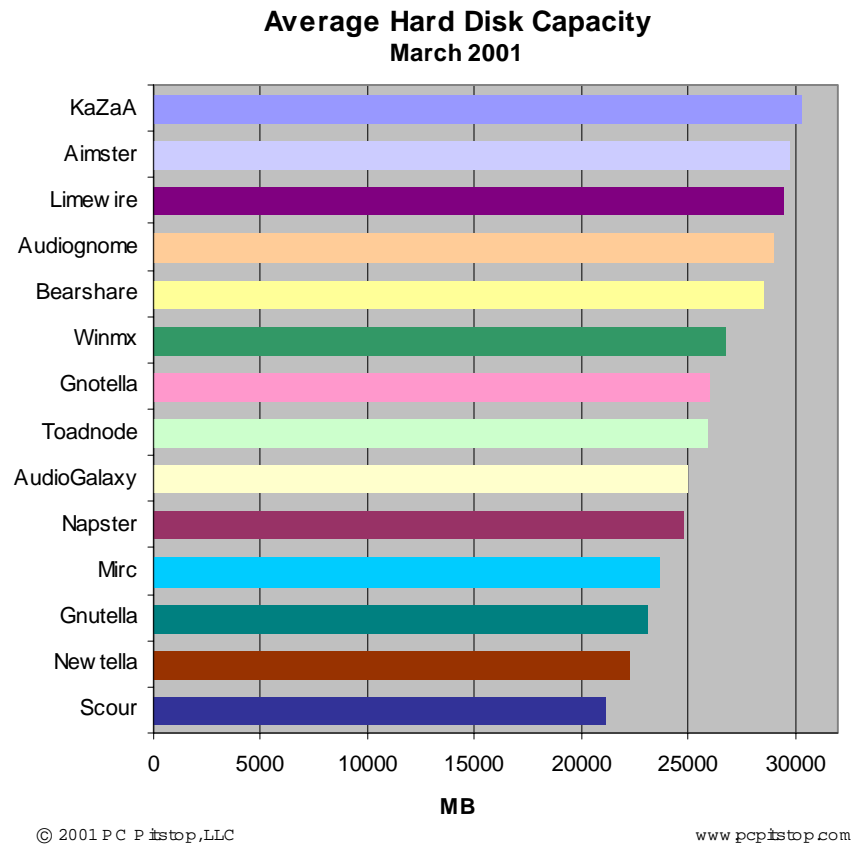


Figure 17

Not only are file-sharing PC hard drives larger, but they're storing more data than the general PC population as well. We can only speculate that the extra data being stored (more than 1GB) is by and large MP3 files. Additionally, since file-sharing PCs are newer, we can conclude that these PCs are consuming hard drive space at a much faster rate. Although file-sharing PCs have more free hard drive space, it's probable that they'll use up their free space before the typical PC does, since the most commonly stored file type is much larger.

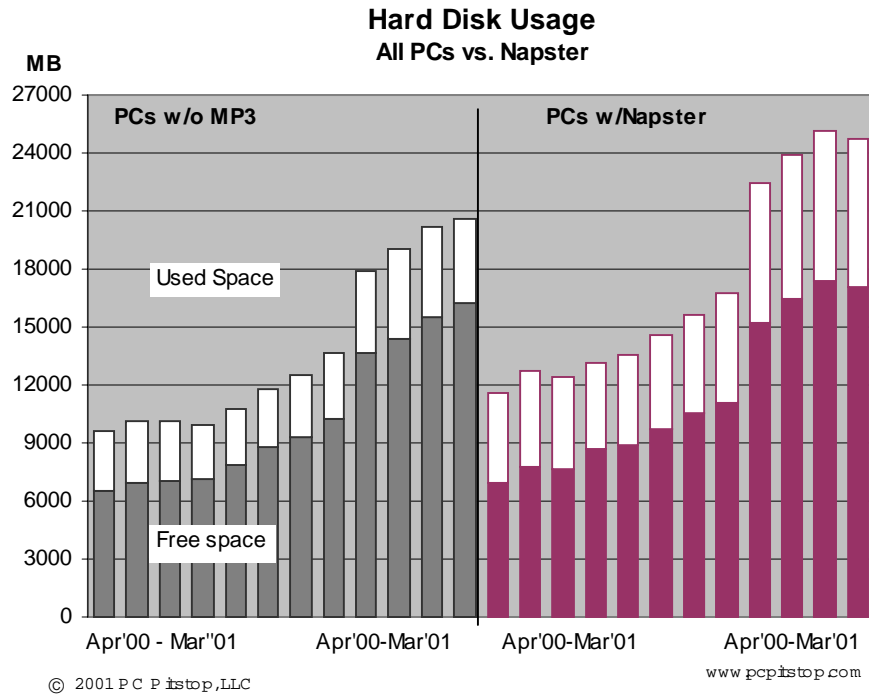


Figure 18

Also, note the very sharp increase in hard drive capacity and usage in December 2000 across all PCs. We speculate that this is due to new PCs purchased over the holiday season.

Installed Memory

On the whole, Napster PCs also have more memory than the average PC; see Figures 19 and 20 below. However, the difference is not nearly as large as the gap in hard disk usage. The average installed RAM for all PCs is more than 160MB, and file-sharing PCs seem to be sticking relatively close to this average as it moves. In this case, the industry average is probably more than enough to support Napster and MP3 playback, so it's not likely that the file-sharing applications will drive memory requirements across the industry.

Nevertheless, the majority of PCs with a file-sharing alternative once again lead the technology curve, showing higher RAM averages than Napster in March 2001 in Figure 20 below.

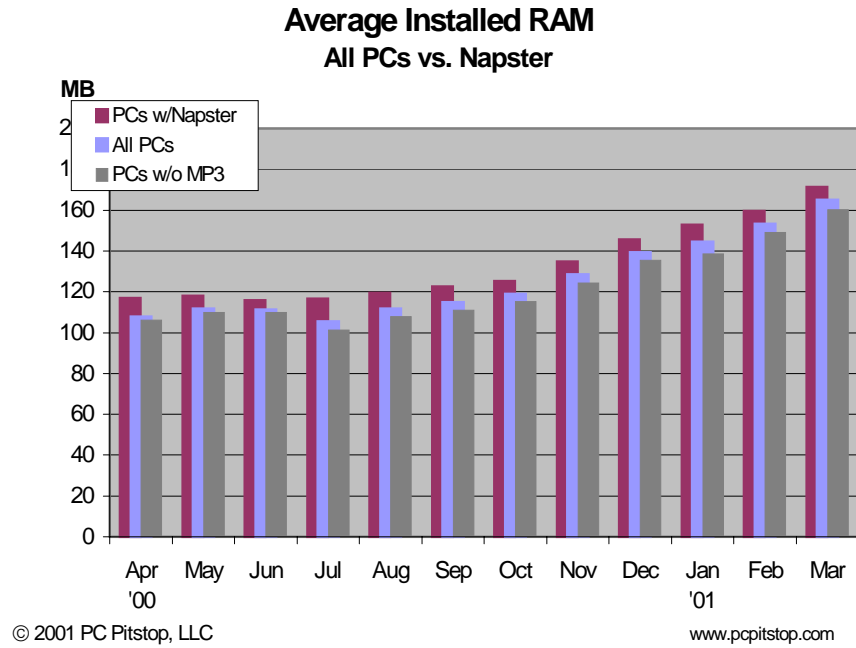
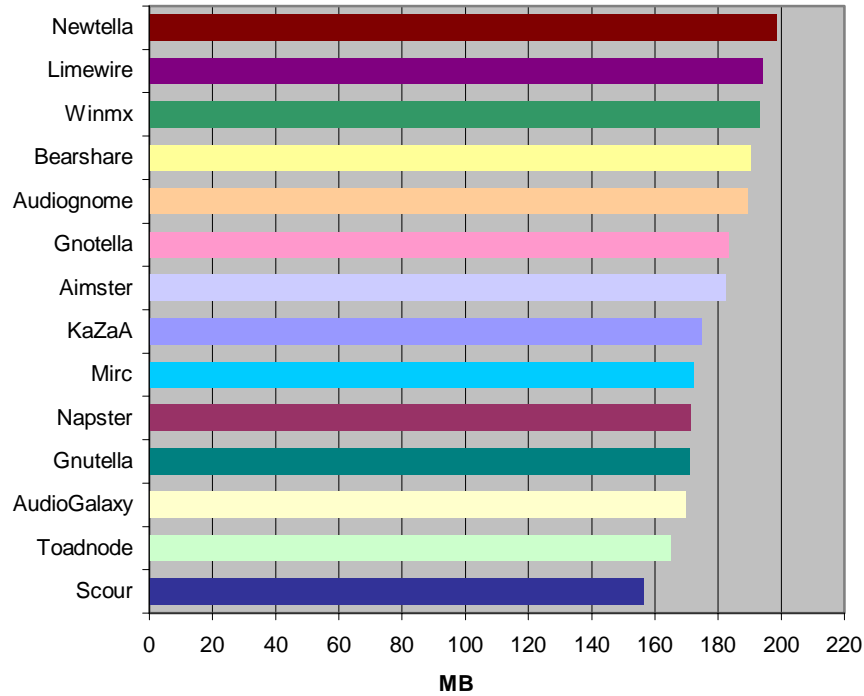


Figure 19

Average Installed RAM

March 2001



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Figure 20

Vendors

Napster has had the potential to quickly create a very strong brand, the type of brand that endures and has substantial long-term value. So which PC vendors are packaging all of this technology (fast CPUs, CD-RW, high-capacity hard drives and fast Internet connections) in the most attractive packages for file-sharing users? Here are the top vendors:

Top Napster PC OEMs		
This Month	Last Month	
1	1	Compaq
2	2	Hewlett-Packard
3	3	Gateway
4	4	Dell
5	5	Microstar
6	7	IBM

This analysis is primarily qualitative. PC Pitstop pulls the vendor information from the BIOS. Many vendors do not populate this information in the BIOS, and quite a few have the manufacturer of the motherboard in the BIOS.

Qualitatively, Compaq is king of the hill. The top four are relatively close, but there is a significant gap between them and the rest.

The Fate of Napster—and What's Ahead

The March injunction has certainly slowed Napster's growth, and as more and more titles are filtered out by the service, more and more users will turn to Napster competitors to share files. However, this does not mean that Napster will go defunct, by any means. Most likely, the service will move to a pay-basis—as will many other file-sharing apps, in all likelihood. Regardless of the format, the file-sharing revolution will continue to thrive, and so will its effect on the PC and Internet markets.

In the coming months, PC Pitstop will continue to closely monitor the progress of Napster and the host of file-sharing competitors that it has spawned. And since many of these services are not centralized, PC Pitstop's unique research services may be the only source for accurate data as the file-sharing phenomenon plays itself out.

Conclusions

- Napster installations have dropped 6% from February to March 2001, likely the result of the court-ordered injunction; approximately 38 percent of PCs examined have Napster installed.
- mIRC, AudioGalaxy, BearShare, WinMX and LimeWire seem to be the most popular Napster competitors; all have shown significant increases in 2001.
- About 41 percent of the home PCs examined at PC Pitstop have Napster installed; about 19 percent of the work PCs examined have Napster installed; and roughly 34 percent of PCs used at both home and work have Napster installed.
- It appears that Napster and file-sharing PCs are driving a transition toward broadband Internet access, and are likely playing a part in new PC sales.
- Napster PCs appear to be driving market acceptance of high-end technology, showing faster CPUs, higher adoption rates of CD-RWs, larger hard drives, more disk usage.
- What's more, PCs with file-sharing alternatives show an even higher occurrence rate of most high-end technology, including faster CPUs, CD-RW drives, larger hard drives, disk usage and RAM.

Appendix A: Methodology

Executable Files Used to Identify Application Installations	
Program	EXE
Aimster	aimster.exe, aimsterUI.exe
AudioGalaxy Satellite	AGSatellite.exe
AudioGnome	client4.exe
BearShare	BearShare.exe, GNetWiz.exe
FileNavigator	FileNavigator.exe
FileTopia	Filetopia.exe
Freenet	freenet.exe
Gnotella	gnotella.exe
Gnutella	gnutella.exe
iMesh	iMeshClient.exe
KaZaA Media Desktop	Kazaa.exe
LimeWire	LimeWire.exe
mIRC	mir32.exe
Napigator	napigator.exe
Napster	napster.exe
NetBrilliant	NetBrilliant.exe
Newtella	Newtella.exe
OnShare	Onshare.exe
Rapigator	rapigator.exe
Scour	scour.exe
SongSpy	SongSpy.exe
Swapoo	swapoo.exe
Swaptor	Swaptor.exe
Toadnode	Toadnode.exe
WinMX	winmx.exe
Yoink	Yoink.exe