

Linux Desktop Migration: Finding the Break-Even Point

Gartner's migration cost and total cost of ownership models show that, depending on the types of users to migrate and the cost to move them to Linux, break-even can be accomplished in as little as six months or as long as never.

Core Topic

Hardware Platforms: Client Platforms

Key Issue

How will desktop and mobile client platforms evolve during the next five years?

In other research, we examined the total cost of ownership (TCO) of Linux on the desktop (see "Linux Desktop TCO: An Overview," "Linux Desktop TCO: Hardware and Software Details" and "Linux Desktop TCO: Labor Details"). We also built a migration cost model (see "Linux Desktop Migration Cost Model"). Here, we combine that research to build a return on investment (ROI) model to evaluate the payback period. The payback period is defined as migration cost divided by TCO savings and is presented in years. These models do not identify the suitability of, or business value provided by, any particular product or operating system (OS), and enterprises must decide on such suitability and identify such benefits in addition to performing the analysis discussed here.

As with all our TCO and cost model research, we remind readers that the most important parts of the models are the frameworks, not the numbers. We strongly advise enterprises to insert their own numbers to provide a more customized and realistic idea of what their costs will be.

We have built two migration cost profiles — one looking at the cost to migrate structured-task workers, and the other to examine the cost to migrate knowledge workers. Structured-task workers are typically a link in a workflow or process and perform the same tasks repetitively. The process workers are driven in their daily jobs by a set process, rather than ad hoc projects. Knowledge workers gather, add value to and communicate information in a decision support process. These resources are driven by projects and ad hoc needs toward flexible tasks. These workers make their own decisions on what to work on and how to accomplish the task. Structured-task workers may use fewer applications than knowledge workers or may use applications differently from knowledge workers. The assumptions made in this model reflect a relatively low-end structured-task worker

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population of 2,500 using only three packaged applications each (out of a total of 30) and a total of 30 custom-developed applications (see Table 1). Although we do not discuss them specifically in this research, data entry workers are the most structured and generally use the fewest applications, mostly to enter data and not to analyze it.

Table 1
Assumptions for Windows-to-Linux Migration Cost Model

					Windows to Linux (Structured-Task Users)	Windows to Linux (Knowledge Workers)
Number of Users					2,500	2,500
Total Number of Custom-Developed Desktop Applications					30	60
Number of Custom Applications Requiring Minor Upgrades					2	4
Number of Custom Applications Requiring Major Upgrades					15	30
Average Number of Packaged Applications per Desktop					3	6 + StarOffice
Percentage of Packaged Applications That Will Be Upgraded Under Windows 2000 Professional					10%	20%
Percentage of Packaged Applications That Can't Be Upgraded and Must Be Replaced					30%	50%
Total Number of Packaged Applications in the Enterprise					30	150
Varieties of Hardware to Test					10	10
Percentage of Users Requiring New PCs					0%	0%
Percentage of Users Requiring Upgraded Hardware					0%	0%
Number of Departments or Groups					15	15

Source: Gartner Research (June 2003)

Table 2 provides a summary of the migration costs, excluding application replacement selection and development, and Table 3 displays the summary with application replacement selection and development costs included. The detailed models are in "Linux Desktop Migration Cost Model." The reason we provide numbers with and without the cost of selecting new packaged applications and application development is because the extreme variability makes it very difficult for us to provide meaningful numbers in the model.

Table 2
Migration Costs Not Including Application Development

Cost Summary Excluding Application Development (Average per User)	Windows to Linux (Structured-Task Users)		Windows to Linux (Knowledge Workers)		Win9x to Win2000/XP (Structured-Task Workers)		Win9x to Win2000/XP (Knowledge Workers)	
	Nominal Best Case	Nominal Worst Case	Nominal Best Case	Nominal Worst Case	Nominal Best Case	Nominal Worst Case	Nominal Best Case	Nominal Worst Case
Hardware	\$ -	\$ -	\$ -	\$ -	\$ 509	\$ 509	\$ 591	\$ 591
Software and Tuition	249	254	2,235	2,240	179	180	369	370
Total Hardware and Software	\$ 249	\$ 254	\$ 2,235	\$ 2,240	\$ 687	\$ 689	\$ 960	\$ 961
Direct Labor	\$ 310	\$ 898	\$ 483	\$ 1,208	\$ 242	\$ 631	\$ 266	\$ 735
End-User Operations	168	498	392	840	112	456	168	616
Total Labor	\$ 478	\$ 1,396	\$ 875	\$ 2,048	\$ 354	\$ 1,088	\$ 434	\$ 1,351
Direct Costs (Hardware, Software, IS Labor)	\$ 559	\$ 1,152	\$ 2,718	\$ 3,448	\$ 930	\$ 1,320	\$ 1,226	\$ 1,696
Indirect Costs (End-User Operations)	\$ 168	\$ 498	\$ 392	\$ 840	\$ 112	\$ 456	\$ 168	\$ 616
Total per User	\$ 727	\$ 1,651	\$ 3,110	\$ 4,288	\$ 1,042	\$ 1,777	\$ 1,394	\$ 2,312

Source: Gartner Research (June 2003)

Table 3
Migration Costs Including Application Development

Cost Summary Including Application Development (Average per User)	Windows to Linux (Structured-Task Users)		Windows to Linux (Knowledge Workers)		Win9x to Win2000/XP (Structured-Task Workers)		Win9x to Win2000/XP (Knowledge Workers)	
	Nominal Best Case	Nominal Worst Case	Nominal Best Case	Nominal Worst Case	Nominal Best Case	Nominal Worst Case	Nominal Best Case	Nominal Worst Case
Hardware	\$ -	\$ -	\$ -	\$ -	\$ 509	\$ 509	\$ 591	\$ 591
Software and Tuition	249	254	2,235	2,240	179	180	369	370
Total Hardware and Software	\$ 249	\$ 254	\$ 2,235	\$ 2,240	\$ 687	\$ 689	\$ 960	\$ 961
Direct Labor	\$ 734	\$ 2,701	\$ 1,460	\$ 5,964	\$ 276	\$ 792	\$ 313	\$ 1,016
End-User Operations	168	498	392	840	112	456	168	616
Total Labor	\$ 902	\$ 3,200	\$ 1,852	\$ 6,804	\$ 388	\$ 1,248	\$ 481	\$ 1,632
Direct Costs (Hardware, Software, IS Labor)	\$ 983	\$ 2,955	\$ 3,695	\$ 8,204	\$ 963	\$ 1,480	\$ 1,273	\$ 1,977
Indirect Costs (End-User Operations)	\$ 168	\$ 498	\$ 392	\$ 840	\$ 112	\$ 456	\$ 168	\$ 616
Total per User	\$ 1,151	\$ 3,454	\$ 4,087	\$ 9,044	\$ 1,075	\$ 1,937	\$ 1,441	\$ 2,593

Source: Gartner Research (June 2003)

The Office Migration: To the Linux migration numbers, we need to add the cost to migrate from Microsoft Office to StarOffice or OpenOffice.org, at least for knowledge workers. The full office automation migration model is discussed in "Office Automation Migration Cost Model," "Office Automation Compatibility Cost/Benefit Model" and "The Costs and Benefits of Moving to Sun's StarOffice 6.0." We are assuming that the migration is being done with the migration to Linux, so we have factored out

the installation cost. Our original migration model focused on structured-task workers (although the structured-task workers we have been discussing in the Linux migration and TCO research have been non-Office users) and suggests that users with higher functional and compatibility requirements would not be suitable candidates for a migration away from Microsoft Office. We will add the base numbers from that research for the structured-task workers here and have made some changes to the assumptions to reflect migration costs for a knowledge worker.

Table 4 presents the general office automation migration assumptions, Table 5 presents the document type assumptions and Table 6 presents the cost summaries. Table 6 also provides the costs for a version upgrade, from Microsoft Office 97 or 2000 to Office 2000 or XP. We are only looking at Office Standard (no Access database) in the numbers here. If Access databases are present, that software must be replaced and the data migrated at additional cost.

Table 4
Migration Assumptions

Assumptions	Structured-Task Worker	Knowledge Worker
Number of Users	2,500	2,500
Number of Departments or Groups	15	15
Avg. Number of Macros per User	0.05	0.10
Avg. Number of Macros per Department	2	2
Avg. Number of Enterprise-Deployed Macros	4	4
Avg. Number of Documents That Require Conversion per User	25	100
Avg. Number of Documents for Conversion per Department	400	750
Avg. Number of Documents Converted at the Enterprise	2,000	5,000

Source: Gartner Research (June 2003)

Table 5
Document Type Assumptions

Structured-Task Workers				Knowledge Workers			
User/Document Types				User/Document Types			
Number	Word Processing	Spreadsheet	Presentation	Number	Word Processing	Spreadsheet	Presentation
	85%	10%	5%		85%	10%	5%
User	21.3	2.5	1.3	User	21.3	2.5	1.3
Dept.	340.0	40.0	20.0	Dept.	340.0	40.0	20.0
Ent.	1,700.0	200.0	100.0	Ent.	1,700.0	200.0	100.0
Document Complexity Mix				Document Complexity Mix			
Easy	90%	80%	85%	Easy	80%	75%	85%
Moderate	7%	15%	10%	Moderate	12%	18%	10%
Complex	3%	5%	5%	Complex	8%	7%	5%
Time/Document (Cross-Vendor)				Time/Document (Cross-Vendor)			
Easy	0.10	0.25	0.25	Easy	0.10	0.25	0.25
Moderate	1.00	2.00	2.00	Moderate	1.00	2.00	2.00
Complex	2.00	8.00	4.00	Complex	2.00	8.00	4.00

Source: Gartner Research (June 2003)

Table 6
Migration Cost Summary for Office Automation Products

Migration Costs: Microsoft Office to StarOffice/OpenOffice.org				
	Structured-Task Workers		Knowledge Workers	
	Nominal Best Case	Nominal Worst Case	Nominal Best Case	Nominal Worst Case
Hardware/Software	\$ -	\$ -	\$ -	\$ -
IS Labor	\$ 534	\$ 1,471	\$ 1,564	\$ 3,762
End-User Labor (Productivity Cost)	\$ 140	\$ 243	\$ 182	\$ 321
Migration Cost per User	\$ 674	\$ 1,714	\$ 1,745	\$ 4,083
Migration Costs: Microsoft Office 97/2000 to 2000/XP				
	Structured-Task Workers		Knowledge Workers	
	Nominal Best Case	Nominal Worst Case	Nominal Best Case	Nominal Worst Case
Hardware/Software	\$ 350	\$ 350	\$ 350	\$ 350
IS Labor	\$ 131	\$ 451	\$ 159	\$ 512
End-User Labor (Productivity Cost)	\$ 27	\$ 55	\$ 27	\$ 56
Migration Cost per User	\$ 508	\$ 855	\$ 536	\$ 918

Source: Gartner Research (June 2003)

Table 7 presents a summary of some of the key TCO profiles. The details are in "Linux Desktop TCO: An Overview," "Linux Desktop TCO: Hardware and Software Details" and "Linux Desktop TCO: Labor Details," but it should be noted that the numbers presented here are different from the numbers presented in that research. Here, we present one set of numbers for structured-task workers and another set for knowledge workers. The other research presents one set of numbers for a mixture of all four user types: 1 percent power users, 20 percent knowledge workers, 74 percent structured-task workers and 5 percent data entry workers. TCO profiles are based on a

hardware life of three years. Enterprises that want to extend hardware life should use their own numbers, keeping in mind that hardware needing repair after warranty may need to be replaced before the end of its planned life, and failures and diversity will increase as PCs get older.

Table 7
TCO Summary

TCO Analysis Overview per User	Structured-Task Workers				Knowledge Workers			
	Win95	WinXP	Linux	Linux Locked	Win95	WinXP	Linux	Linux Locked
Direct Costs (Budgeted)								
Hardware and Software	\$1,381	\$1,381	\$1,273	\$1,259	\$1,569	\$1,569	\$1,441	\$1,424
Operations	\$651	\$616	\$617	\$537	\$700	\$661	\$663	\$575
Administration	\$384	\$384	\$384	\$379	\$403	\$403	\$403	\$398
Total Direct Costs per User	\$2,416	\$2,381	\$2,274	\$2,175	\$2,672	\$2,633	\$2,507	\$2,397
Indirect Costs (Unbudgeted)								
End-User Operations	\$3,149	\$2,626	\$2,897	\$2,135	\$3,730	\$3,128	\$3,456	\$2,570
Downtime	\$334	\$142	\$134	\$91	\$345	\$147	\$139	\$94
Total Indirect Costs per User	\$3,483	\$2,767	\$3,031	\$2,226	\$4,075	\$3,274	\$3,594	\$2,664
Annual Total Cost of Ownership (TCO) per User	\$5,898	\$5,148	\$5,305	\$4,402	\$6,747	\$5,908	\$6,101	\$5,062

Source: Gartner Research (June 2003)

Table 8 starts putting the two together. For the migration costs, we use the numbers in the migration model in Table 1 with all nonhardware costs increased by 20 percent above our nominal best case. Hardware costs are more predictable than software and labor, so in choosing a moderate choice between nominal best and worst, we raise the software and labor and leave the hardware as originally estimated.

Table 8

Payback Period in Migrating to a Linux Desktop, Not Including Application Development Costs

Migration Cost to Linux (not Including Application Development)	Structured-Task Workers		Knowledge Workers	
	Win95 (Based on Nominal Best Cost +20%)	WinXP (Based on Nominal Best Cost +20%)	Win95 (Based on Nominal Best Cost +20%)	WinXP (Based on Nominal Best Cost +20%)
Direct Linux Migration Costs	\$ 670	\$ 670	\$ 3,262	\$ 3,262
Indirect Linux Migration Costs	\$ 202	\$ 202	\$ 470	\$ 470
Total Linux Migration Costs	\$ 872	\$ 872	\$ 3,733	\$ 3,733
Direct Office Migration Costs	\$ 641	\$ 641	\$ 1,876	\$ 1,876
Indirect Office Migration Costs	\$ 140	\$ 140	\$ 182	\$ 182
Total Direct Costs	\$ 1,311	\$ 1,311	\$ 5,138	\$ 5,138
Total Indirect Costs	\$ 341	\$ 341	\$ 652	\$ 652
Total Cost	\$ 1,653	\$ 1,653	\$ 5,791	\$ 5,791
Direct Savings (Cost) at Unmanaged Linux	\$141	\$107	\$165	\$127
Indirect Savings (Cost) at Unmanaged Linux	\$452	(\$264)	\$481	(\$320)
Total Savings (Cost) at Unmanaged Linux	\$594	(\$157)	\$646	(\$193)
Payback Including Office Migration Costs				
Payback Period (Direct Costs Only)	9.3 years	12.3 years	31.2 years	40.6 years
Payback Period (Indirect Costs Only)	0.8 years	n/a	1.4 years	n/a
Payback Period (Total Cost)	2.8 years	n/a	9.0 years	n/a
Payback Not Including Office Migration Costs				
Payback Period (Direct Costs Only)	4.7 years	6.3 years	19.8 years	25.8 years
Payback Period (Indirect Costs Only)	0.4 years	n/a	1.0 years	n/a
Payback Period (Total Cost)	1.5 years	n/a	5.8 years	n/a
Direct Savings (Cost) at Locked Linux	\$240	\$205	\$274	\$236
Indirect Savings (Cost) at Locked Linux	\$1,257	\$805	\$1,411	\$610
Total Savings (Cost) at Locked Linux	\$1,497	\$1,010	\$1,685	\$846
Payback Including Office Migration Costs				
Payback Period (Direct Costs Only)	5.5 years	6.4 years	18.7 years	21.8 years
Payback Period (Indirect Costs Only)	0.3 years	0.4 years	0.5 years	1.1 years
Payback Period (Total Cost)	1.1 years	1.6 years	3.4 years	6.8 years
Payback Not Including Office Migration Costs				
Payback Period (Direct Costs Only)	2.8 years	3.3 years	11.9 years	13.8 years
Payback Period (Indirect Costs Only)	0.2 years	0.3 years	0.3 years	0.8 years
Payback Period (Total Cost)	0.6 years	0.9 years	2.2 years	4.4 years

Source: Gartner Research (June 2003)

Another choice the enterprise needs to make in analyzing the payback period is whether to examine indirect costs as well as direct costs. Direct costs are money spent on hardware, software and IS labor (internal and contractors). Indirect costs are softer, less measurable costs of lost productivity. There are areas of lost productivity during the migration as users have their work disrupted, and after the migration to the extent that users have issues adjusting to the new environment or with compatibility.

Table 8 shows that, before application migration costs are considered, structured-task workers moving from Windows 95 to unlocked, unmanaged Linux would have a payback period of 4.7 years if only direct costs are considered and 1.5 years if direct and indirect costs are considered and Microsoft Office is not in use. The same user on a modern, more stable OS, such as Windows XP, will not see ROI if indirect and direct costs are considered. For knowledge workers, the hurdle is much higher, and we are skeptical that ROI can be attained in either case (and this is before application development migration costs are added). If Office costs are added, structured-task workers would have to wait 9.3 years to see ROI based on direct costs alone, and 2.8 years based on direct and indirect costs.

When we look at a locked, but unmanaged, Linux environment (user does not have root access, but management tools are not used), we see that structured-task workers show a good chance of ROI (from Windows 95 if Office is not used — 2.8 years based on only direct savings and less than a year if all costs are considered), and even knowledge workers show some promise of ROI in 2.2 to 4.4 years, but this does not include the office automation migration or application migration costs. When the office automation migration costs are added, the knowledge worker payback period increases to 3.4 years for Windows 95 and 6.8 years for Windows XP. However, we remind enterprises that if political or cultural problems have been preventing Windows lockdown, they may not be able to lock Linux desktops, either. Enterprises with applications to move must read on to include those costs in their migration.

Table 9 adds in the costs using our estimates to evaluate replacement applications and to redevelop internal applications so they will run under Linux (generic browser, Java or native Linux). Again, the structured-task workers have a chance at attaining ROI in less than a year (if moving from Windows 95 to locked Linux) or 2.3 years (if moving from Windows 95 to unlocked Linux). However, enterprises should make sure they understand the assumptions used in our migration model, because we purposely assumed a narrow range of applications in use that would have to be replaced. Better yet, enterprises should replace our estimates with their own. For knowledge workers, who have many applications that are liable to need to be replaced, we foresee little chance of payback in a reasonable time frame. Knowledge workers who can be locked will see some possibility of payback in 2.9 to 5.8 years, but only when indirect savings are counted and if the Office migration is not included. If only direct savings are included and if Office is considered, the payback period is 23 to 26.7 years, and enterprises should consider whether they can stay on Windows and lock it down instead, thus reducing the migration costs while still reaping

lockdown benefits, which would be significant no matter the platform. Certainly, if the enterprise identifies other costs or benefits, these should be included as well.

Table 9
Payback Period in Migrating to a Linux Desktop, Including Application Development Costs

Migration Cost to Linux (Including Application Development)	Structured-Task Workers		Knowledge Workers	
	Win95 (Based on Nominal Best Cost +20%)	WinXP (Based on Nominal Best Cost +20%)	Win95 (Based on Nominal Best Cost +20%)	WinXP (Based on Nominal Best Cost +20%)
Direct Linux Migration Costs	\$ 1,180	\$ 1,180	\$ 4,434	\$ 4,434
Indirect Linux Migration Costs	\$ 202	\$ 202	\$ 470	\$ 470
Total Linux Migration Costs	\$ 1,381	\$ 1,381	\$ 4,905	\$ 4,905
Direct Office Migration Costs	\$ 641	\$ 641	\$ 1,876	\$ 1,876
Indirect Office Migration Costs	\$ 140	\$ 140	\$ 182	\$ 182
Total Direct Costs	\$ 1,821	\$ 1,821	\$ 6,310	\$ 6,310
Total Indirect Costs	\$ 341	\$ 341	\$ 652	\$ 652
Total Cost	\$ 2,162	\$ 2,162	\$ 6,962	\$ 6,962
Direct Savings (Cost) at Unmanaged Linux	\$141	\$107	\$165	\$127
Indirect Savings (Cost) at Unmanaged Linux	\$452	(\$264)	\$481	(\$320)
Total Savings (Cost) at Unmanaged Linux	\$594	(\$157)	\$646	(\$193)
Payback Including Office Migration Costs				
Payback Period (Direct Costs Only)	12.9 years	17.1 years	38.3 years	49.8 years
Payback Period (Indirect Costs Only)	0.8 years	n/a	1.4 years	n/a
Payback Period (Total Cost)	3.6 years	n/a	10.8 years	n/a
Payback Not Including Office Migration Costs				
Payback Period (Direct Costs Only)	8.3 years	11.1 years	26.9 years	35.0 years
Payback Period (Indirect Costs Only)	0.4 years	n/a	1.0 years	n/a
Payback Period (Total Cost)	2.3 years	n/a	7.6 years	n/a
Direct Savings (Cost) at Locked Linux	\$240	\$205	\$274	\$236
Indirect Savings (Cost) at Locked Linux	\$1,257	\$541	\$1,411	\$610
Total Savings (Cost) at Locked Linux	\$1,497	\$746	\$1,685	\$846
Payback Including Office Migration Costs				
Payback Period (Direct Costs Only)	7.6 years	8.9 years	23.0 years	26.7 years
Payback Period (Indirect Costs Only)	0.3 years	0.6 years	0.5 years	1.1 years
Payback Period (Total Cost)	1.4 years	2.9 years	4.1 years	8.2 years
Payback Not Including Office Migration Costs				
Payback Period (Direct Costs Only)	4.9 years	5.8 years	16.2 years	18.8 years
Payback Period (Indirect Costs Only)	0.2 years	0.4 years	0.3 years	0.8 years
Payback Period (Total Cost)	0.9 years	1.9 years	2.9 years	5.8 years

Source: Gartner Research (June 2003)

The Windows XP Alternative: When making a decision whether to move to Linux, enterprises must also compare the costs to moving to newer versions of Windows. An issue to consider both in this case and in the cases above is the issue of hardware

replacement. The migration model assumes no hardware will be replaced or upgraded during a move to Linux, whereas we assume 20 percent of hardware will be upgraded and another one-third will be replaced during a migration Windows XP. All the numbers above include the cost of new hardware for Windows as part of the migration costs. Enterprises that are planning to upgrade to Windows XP without replacing extra hardware above normal refresh may not want to consider the hardware costs as part of their ROI calculation. Table 10 provides a summary of migration costs to move from Windows 95 to Windows XP, including application development costs; we included one column for Windows XP with the cost of new hardware and another column without that cost.

Table 10
Cost to Migrate From Windows 95 to Linux and Windows XP, Including Application Development

Migration Cost From Win95 (Including Application Development and New Hardware)	Structured-Task Workers			Knowledge Workers		
	Migration to Linux (Incl. Application Development)	Migration to WinXP (Incl. Application Development and New Hardware)	Migration to WinXP (Incl. Application Development but Not New Hardware)	Migration to Linux (Incl. Application Development)	Migration to WinXP (Incl. Application Development and New Hardware)	Migration to WinXP (Incl. Application Development but Not New Hardware)
Direct Linux Migration Costs	\$ 1,180	\$ 1,054	\$ 545	\$ 4,434	\$ 1,409	\$ 818
Indirect Linux Migration Costs	\$ 202	\$ 134	\$ 134	\$ 470	\$ 202	\$ 202
Total Linux Migration Costs	\$ 1,381	\$ 1,188	\$ 680	\$ 4,905	\$ 1,611	\$ 1,020
Direct Office Migration Costs	\$ 641	\$ 507	\$ 507	\$ 641	\$ 540	\$ 540
Indirect Office Migration Costs	\$ 140	\$ 27	\$ 27	\$ 140	\$ 55	\$ 55
Total Direct Costs	\$ 1,821	\$ 1,561	\$ 1,053	\$ 5,075	\$ 1,949	\$ 1,358
Total Indirect Costs	\$ 341	\$ 162	\$ 162	\$ 610	\$ 256	\$ 256
Total Cost	\$ 2,162	\$ 1,723	\$ 1,214	\$ 5,685	\$ 2,205	\$ 1,614
Direct Savings (Cost) at Unmanaged WinXP	\$141	\$35	\$35	\$165	\$38	\$38
Indirect Savings (Cost) at Unmanaged WinXP	\$452	\$716	\$716	\$481	\$801	\$801
Total Savings (Cost) at Unmanaged WinXP	\$594	\$751	\$751	\$646	\$839	\$839
Payback Including Office Migration Costs						
Payback Period (Direct Costs Only)	12.9 years	44.7 years	30.2 years	30.8 years	51.0 years	35.5 years
Payback Period (Indirect Costs Only)	0.8 years	0.2 years	0.2 years	1.3 years	0.3 years	0.3 years
Payback Period (Total Cost)	3.6 years	2.3 years	1.6 years	8.8 years	2.6 years	1.9 years
Payback Not Including Office Migration Costs						
Payback Period (Direct Costs Only)	8.3 years	30.2 years	15.6 years	26.9 years	36.8 years	21.4 years
Payback Period (Indirect Costs Only)	0.4 years	0.2 years	0.2 years	1.0 years	0.3 years	0.3 years
Payback Period (Total Cost)	2.3 years	1.6 years	0.9 years	7.6 years	1.9 years	1.2 years

Source: Gartner Research (June 2003)

Table 10 shows that migrations from one version of Windows to another are expensive projects during which ROI is difficult to find as well. Not including the cost of new hardware, for the structured-task workers described by this model, a move from Windows 95 to XP will take nearly 16 years to pay back the

investment based only on direct savings, but when indirect savings are examined, ROI can be achieved in less than a year because of the improved stability of Windows XP over Windows 95. In the same case, Linux actually shows a faster payback period based on direct costs only (8.3 years) but a longer payback overall (2.3 years). As Gartner has been saying for years, enterprises should try to improve desktop management while they do migrations and use the migration as a catalyst to enact political and cultural change when possible.

For knowledge workers, the significantly higher cost of replacing a broad array of applications keeps Linux a relatively poor choice for an upgrade from Windows 95 compared to a move to Windows XP. Not including new hardware, Linux shows payback of almost 27 years based on direct-cost savings only and 7.6 years overall. This is compared to 21.4 years based on direct savings only and 1.2 years overall for a move to Windows XP. When Office migration costs are included, payback increases to almost nine years for Windows 95 users and between 1.9 and 2.6 years for XP users, depending on whether new hardware is included.

If new hardware must be purchased solely to support the migration to XP and the cost is assigned to the project, ROI will be more difficult to achieve, but still reachable if indirect savings are included. Enterprises may also decide to allocate only a portion of the hardware cost to the XP migration project, and this may improve the documented ROI.

Bottom Line: Users with few applications to migrate and those moving from older versions of Windows will be the best candidates for moving to Linux on the desktop. These users may see payback on the investment in less than three years. Knowledge workers, who need access to a wide variety of applications, will be more difficult and expensive to move to Linux, and payback will take considerably longer, if it ever occurs. Enterprises planning on migrating applications for the purpose of moving users to Linux may not realize the payback that they expect on their investment.

Acronym Key

OS	operating system
ROI	return on investment
TCO	total cost of ownership