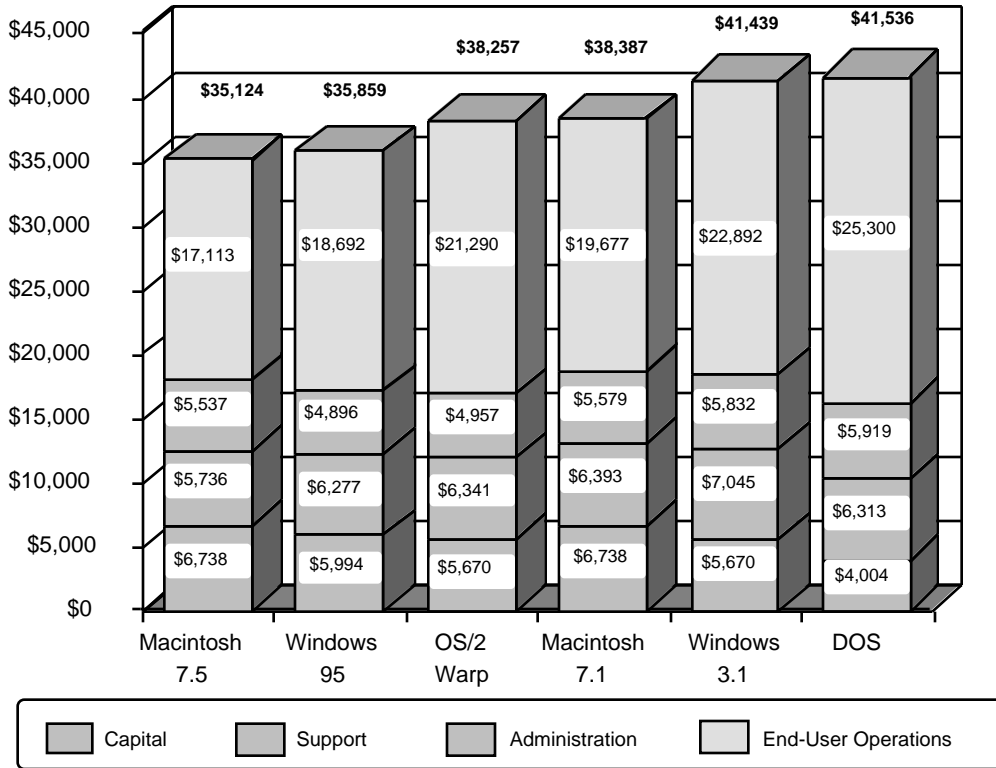1. **How will the evolution of desktop computing force organizations to re-engineer PC hardware acquisition and asset management strategies?**

2. **How will PC hardware asset procurement and management challenges affect vendor selection strategies?**

3. **What PC hardware acquisition strategies and tactics will ensure the greatest investment protection in the face of rapid, continuous technological change?**

4. **What tools, technologies and management practices will have the greatest impact on PC hardware asset manageability during the 1990s?**

How will the evolution of desktop computing force organizations to re-engineer PC hardware acquisition and asset management strategies?
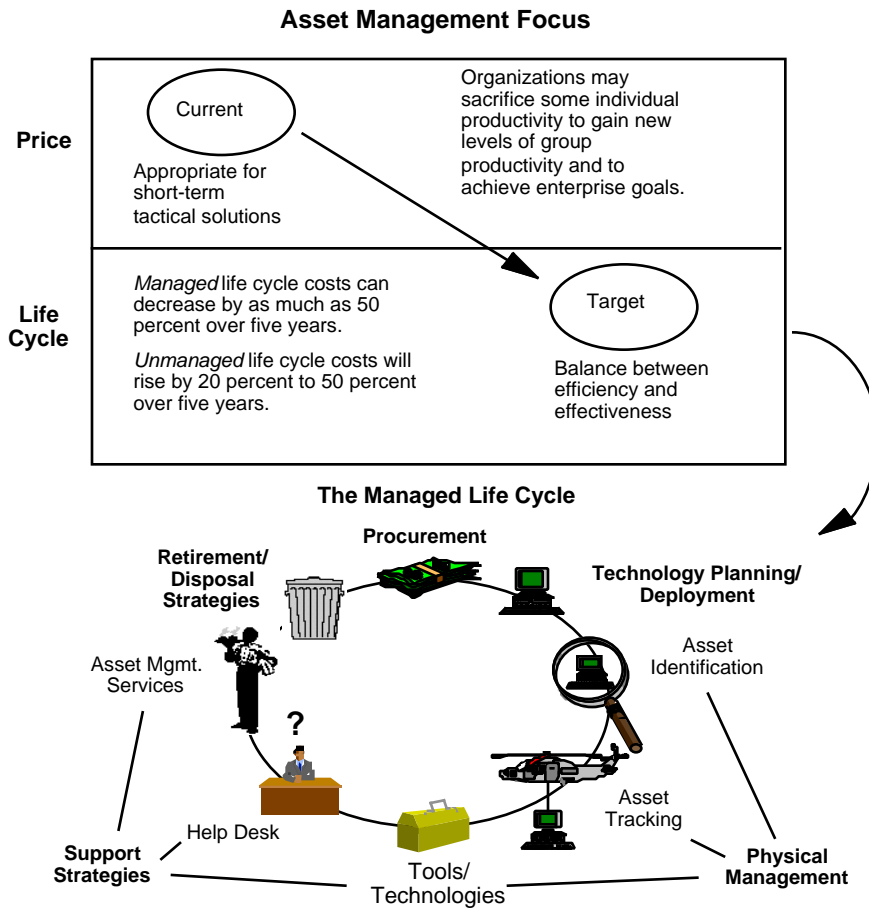
Reader Notes

Dynamic Planning Points for End-User Computing

1995

Desktop Architecture Components		Type A	Type B	Type C
Hardware Architecture	8-bit 16-bit 32-bit LAN	0-5% 0-20% 80-100% 80-100%	0-10% 15-40% 50-80% 40-70%	5-25% 35-55% 20-40% 5-40%
System Software	Char. GUI GUI++	0-30% 40-100% 5-30%	20-60% 40-70% 0-20%	60-90% 10-40% 0-10%
Application Architecture		C/S Prod. Apps. OO	Prod. Apps. LAN Apps.	Prod. Apps.
Management Practices	Capital/ Labor Five-Year TCO Supp. Ratio	24%:76% $44,000 1:70	14%:86% $42,000 1:120	10%:90% $38,000 1:200
Vendor/ Channel Management	PC Vendors	Less than 20	More than 10	More than 5
Advanced Technology		Multimedia Groupware PDAs Wireless	Multimedia E-Mail C/S	LAN

1999

		Type A	Type B	Type C
	16-bit 32-bit 64-bit RISC LAN	0% 30-40% 20-30% 10-20% 100%	0-5% 35-65% 5-10% 5-10% 90-100%	5-15% 30-80% 0-5% 0-5% 60-90%
	Char. GUI GUI++	0% 0-20% 80-100%	0% 30-60% 40-70%	0 - 20% 40-80% 10-50%
		Beyond C/S Workgroup OO Tele. Integ.	Prod. Apps. C/S OO Video Conf.	C/S Prod. Apps.
	Capital/ Labor Five-Year TCO Supp. Ratio	40%:60% $32,000 1:300	30%:70% $49,000 1:200	20%:80% $45,000 1:250
	PC Vendors	Less than 80	More than 20	More than 10
		VR, Neural Nets, Adaptive Agents	Smartcards, Wireless Hand Wri. Recog.	Multimedia C/S PDAs Spch. Rec.

Central to Empower — Decentralized — Central to Control

Organization

Central to Empower — Decentralized — Central to Control

IT Strategy — Business Strategy

IT Strategy — Business Strategy

Source: Gartner Group

Enterprises too often manage pieces of hardware instead of managing the overall computing strategy. IS organizations must work closely with business unit managers and finance groups to develop an asset database of today's installed base and a model of what the asset base will be five years from now. To develop this forward-looking model, business unit managers, executives, the IS organization and the finance staff must understand the enterprise's five-year business plan, the technological advancements that are most likely to occur, and the enterprise's financial goals.

Failing to properly manage the PC asset base will result in inappropriately allocated assets throughout the enterprise, and new, nonstrategic hardware purchases. By moving older equipment to an entry-level or mainstream user, rather than purchasing less-powerful equipment for these users, the enterprise can increase the magnitude, if not the effectiveness, of its total computing platform. Educating departments, business units and end users to think of PCs as a company asset, rather than a personal possession, will be critical in alleviating the mismanagement of hardware.

Poor hardware planning or neglect will have a significant impact on cost of ownership and leave organizations unable to exploit next-generation software environments (0.8 probability).

PC Total Cost of Ownership by System Software Platform
(All Figures in U.S.$)

	Macintosh 7.5	Windows 95	OS/2 Warp	Macintosh 7.1	Windows 3.1	DOS
Total	$35,124	$35,859	$38,257	$38,387	$41,439	$41,536
End-User Operations	$17,113	$18,692	$21,290	$19,677	$22,892	$25,300
Administration	$5,537	$4,896	$4,957	$5,579	$5,832	$5,919
Support	$5,736	$6,277	$6,341	$6,393	$7,045	$6,313
Capital	$6,738	$5,994	$5,670	$6,738	$5,670	$4,004

Legend: Capital, Support, Administration, End-User Operations

Source: Gartner Group

Key Issue: How will the evolution of desktop computing force enterprises to re-engineer PC hardware acquisition and asset management strategies?

TCO Model Assumptions: The installed base consists of 2,500 networked PCs (homogeneous platform), eight applications (except DOS, which assumes four applications), and considers desktop costs only (one laser printer per 15 users and NIC included) in constant U.S. dollars.

The PC Five-Year Life Cycle Total Cost of Ownership Model is based on a combination of industry data, custom consulting projects and "stalking horses." At its foundation are years of work with our clients to establish a quantitative framework to research IT cost issues. This model should be used to assess and manage how changes in technology, IT decisions and implementation strategies will affect costs. Although the costs are accurate for the expressed assumptions, we encourage clients to run their own assumptions through these models to determine site-specific internal costs. Differences in labor rates, implementation strategies, as well as varied funding and accounting practices can significantly affect the results.

The PC total cost of ownership will grow for enterprises that fail to adopt a holistic, life cycle approach to desktop acquisition and asset management (0.8 probability).

Asset Management Focus

Price

Current

Appropriate for
short-term
tactical solutions

Organizations may
sacrifice some individual
productivity to gain new
levels of group
productivity and to
achieve enterprise goals.

Life
Cycle

Managed life cycle costs can
decrease by as much as 50
percent over five years.

Unmanaged life cycle costs will
rise by 20 percent to 50 percent
over five years.

Target

Balance between
efficiency and
effectiveness

The Managed Life Cycle

Procurement

**Retirement/
Disposal
Strategies**

**Technology Planning/
Deployment**

Asset Mgmt.
Services

Asset
Identification

?

Help Desk

Asset
Tracking

**Support
Strategies**

Tools/
Technologies

**Physical
Management**

Source: Gartner Group

Key Issue: How will the evolution of desktop computing force enterprises to re-engineer PC hardware acquisition and asset management strategies?

Recent surveys of Gartner Group clients have shown that more than 75 percent of user organizations are planning (or involved in) major asset management projects — many of which span the enterprise. Given its bottom-up evolution and rapid rate of technological flux, PC hardware represents one of the greatest asset management challenges. Manufacturers, software developers, service providers and leasing companies are entering the asset management fray with a multitude of product and service offerings. Asset management, however, has more to do with services and organizational approaches than with single products. Most products are oriented toward point solutions (disguised as a "module" or product suite) that address pieces of the overall IT asset management puzzle; they do not offer an integrated solution.

How will PC hardware asset procurement and management challenges affect vendor selection strategies?

PC Hardware Vendor Tiering Model

Consolidated Tier 1/Tier 2		Tier 1
Acer (W)	Dell (W)	Apple (W)
Apple (W)	HP (W)	Compaq (W)
AST (W)	IBM (W)	IBM (W)
AT&T (W)	ICL (E)	Toshiba (W)
Bull/Zenith (W)	NEC (W)	
Compaq (W)	Olivetti (E)	**Tier 2**
Digital (W)	Siemens Nixdorf (E)	AST (W)
		Bull/Zenith (W)
Tier 3		Dell (W)
ALR (U)	Packard Bell (U)	Digital (W)
Amstrad (E)	Swan (U)	HP (W)
Apricot (E)	Tulip (E)	AT&T (W)
Elonex (E)	Unisys (W)	NEC (W)
Epson (W)	Vobis (E)	Olivetti (E)
Everex (U)	Zeos (U)	
Gateway (U)		**Tier 3**
Galaxy (U)	Lucky (U)	Gateway (U)
Jade (U)	MilkyWay (U)	Zeos (U)
Jumbo (E)	RSA (E)	Panasonic (W)

E=European vendor
U=U.S. vendor
W=Worldwide vendor

Source: Gartner Group

Gartner Group's PC Hardware Vendor Tiering Model was introduced during the late 1980s to help clients select vendors with the least exposure to financial instability, quality problems or service and support issues. Historically, we have ranked vendors in three different tiers. Tier 1 and Tier 2 have represented our recommended list of vendors — all have met specific financial, quality, and unit volume criteria. The Tier 1 vendors (i.e., IBM, Apple Computer Inc. and Compaq Computer Corp.) were set apart from the Tier 2 vendors because of their market leadership and influential position in the industry. These differentiators carry historical significance only, and they are of little consequence in today's vendor selection decisions. As a result, we no longer recognize Tier 1 and Tier 2 vendors as separate groups.

Users must carefully match organizational requirements and desktop computing objectives with vendor capabilities. Otherwise, management costs and complexity will increase.

Reader Notes

PC Hardware Vendor Tiering Model

Consolidated Tier 1/Tier 2		Tier 1
Acer (W) Dell (W)		Apple (W)
Apple (W) HP (W)		Compaq (W)
AST (W) IBM (W)		IBM (W)
AT&T (W) ICL (E)		Toshiba (W)
Bull/Zenith (W) NEC (W)		
Compaq (W) Olivetti (E)		Tier 2
Digital (W) Siemens Nixdorf (E)		AST (W)

Tier 3
ALR (U)   Packard Bell (U)
Amstrad (E)   Swan (U)
Apricot (E)   Tulip (E)
Elonex (E)   Unisys (W)
Epson (W)   Vobis (E)
Everex (U)   Zeos (U)
Gateway (U)

Galaxy (U)   Lucky (U)
Jade (U)   MilkyWay (U)
Jumbo (E)   RSA (E)

Tier 2
Bull/Zenith (W)
Dell (W)
Digital (W)
HP (W)
AT&T (W)
NEC (W)
Olivetti (E)

Tier 3
Gateway (U)
Zeos (U)
Panasonic (W)

E=European vendor
U=U.S. vendor
W=Worldwide vendor

PC Hardware Vendor Suitability Model

Column headers (diagonal): Alliances/Partnerships, Asset Management, Distribution Breadth, Large-Account Support, Multinational Support, Price Aggressiveness, Product Availability, Product Breadth, Product Support, Solutions Support, Tech. Aggressiveness, Value-Added Services, Warranty Programs

User Importance
- Very Important
- Important — *Gartner Group/Client Collaboration*
- Unimportant

Vendor Capability
- Above Average
- Average — *Gartner Group Resources*
- Below Average

Approved Purchase List	**RFP Evaluation List**
Minimum = 2	Minimum = 3
Maximum = 3	Maximum = 6

Source: Gartner Group

Key Issue: How will PC hardware asset procurement and management challenges affect vendor selection strategies?

Many industry observers believe the PC hardware marketplace is commoditized. Granted, systems have reached a high level of standardization, but vendor capabilities vary considerably across a spectrum of other important measures. The PC Hardware Vendor Suitability Model is an extension of our vendor evaluation (i.e., tiering) methodology. For clients that are planning PC acquisitions, this model helps to assess the relative importance of various requirements and maps them against vendor capabilities. By using this model, clients can ensure that they are making the right vendor decision(s). Choosing the right vendor will ultimately result in reduced cost of ownership. Increasingly, PC hardware manufacturers are placing less emphasis on technology and price/performance and more on capabilities that transcend hardware (e.g., value-added unbundling of services, manageability, and cost of ownership).

What PC hardware acquisition strategies and tactics will ensure the greatest investment protection in the face of rapid, continuous technological change?
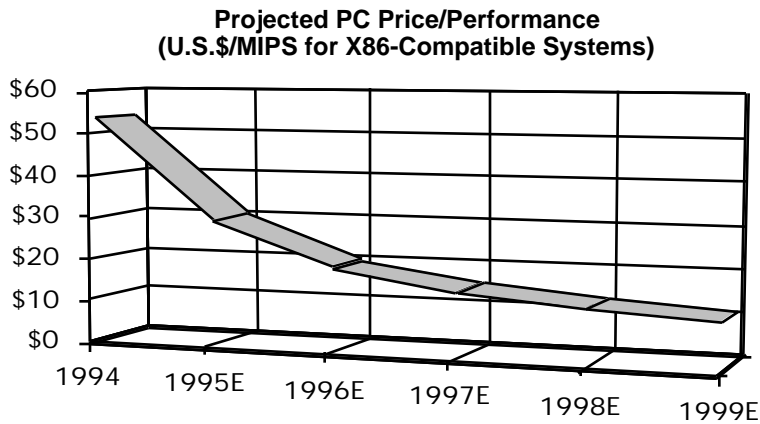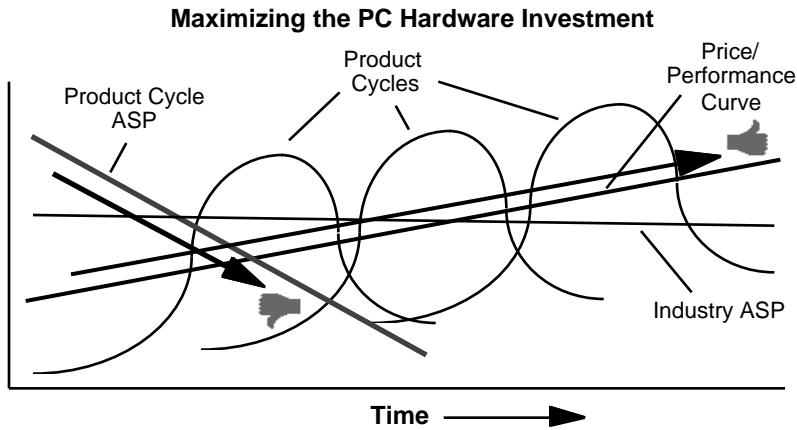
	RFI	RFP
Purpose	Data gathering Filter mechanism	Evaluation
Length	Short	Long
Detail	General	Specific: • Business environment • Technical requirements • Service-level agreements
Send to	Many vendors	Few vendors
Review	Task force	Enterprise: • Task force • IS management • Sponsoring users • Comptroller • Internal auditors • Legal counsel
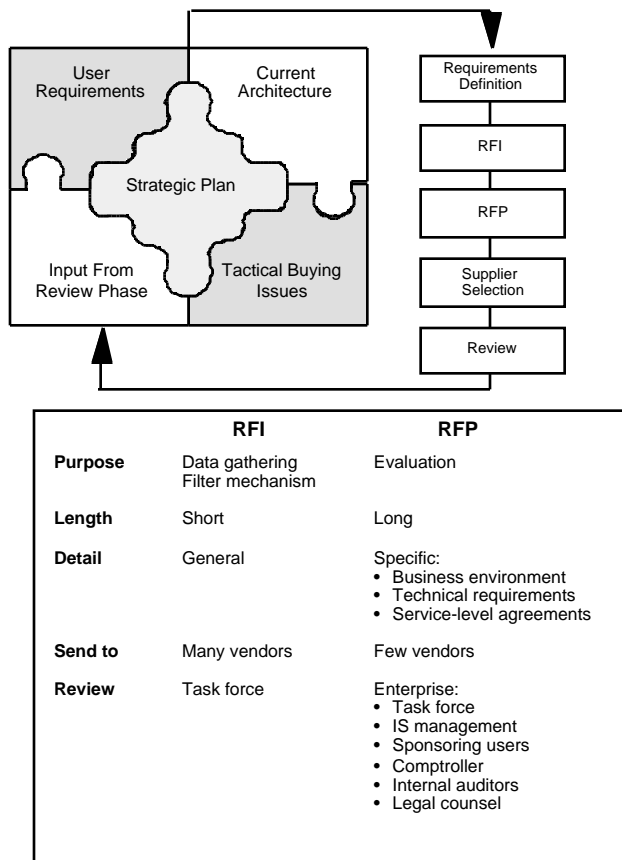
Source: Gartner Group

RFIs and RFPs are the starting point for effective PC hardware acquisition planning. They can be combined in a single document, but writing them separately saves time in the selection process. The RFI is ideal for gathering information quickly and getting an overview of suppliers; it can filter out unqualified suppliers early on. RFPs should be written in a modular fashion, getting separate bids for each area. Instead of having one vendor supply four different types of service inefficiently, users can either choose several providers and act as the general contractor, or make things easier for a single-point-of-contact provider to subcontract service and fulfillment pieces. The RFP is an evaluation tool used to consistently compare specific, customized supplier offerings. The process of writing it also helps users to clarify their requirements. Responses to a well-written RFP allow users to get enough information from each supplier to determine the best fit for the future partnership. A good RFP can make writing the final contract easier, because most issues will be spelled out in the RFP or in the responses. The goal should be to buy the smartest solution, not the least expensive.

Organizations should use the following desktop configurations to find the best match of hardware with organizational profiles.

Intel-Based Desktop Configurations

		Entry-Level	Mainstream	Power User	
Technology-Driven	Processor Memory DASD Monitor Video Price	486DX4/100 * 8 MB, 128 KB cache 540 MB 15-inch Local bus SVGA 1 MB video RAM U.S.$1,700-U.S.$2,100	Pentium/75 16 MB, 256 KB cache 540-730 MB 15-inch PCI local bus SVGA 1 MB video RAM U.S.$2,000-U.S.$2,600	Pentium/100 20-24 MB, 256 KB cache 730 MB to 1 GB 17-inch PCI local bus SVGA 2 MB video RAM U.S.$3,000-U.S.$4,200	Type A
– – –	– –	– – – – –	– – – – –	– – – – –	Type B
Price-Driven	Processor Memory DASD Monitor Video Price	486DX2/66 8 MB, 128 KB cache 340 MB 14-inch Local bus SVGA 1 MB video RAM U.S.$1,500-U.S.$1,900	486DX4/100 * 8-16 MB, 128 KB cache 540 MB 15-inch Local bus SVGA 1 MB video RAM U.S.$1,700-U.S.$2,400	Pentium/75 16 MB, 256 KB cache 540-730 MB 15-inch PCI local bus SVGA 1 MB video RAM U.S.$2,000-U.S.$2,600	Type C

Apple Desktop Configurations

		Entry-Level	Mainstream	Power User	
Technology-Driven	Processor Memory DASD Monitor Video Price	PowerPC 6100/66 16 MB 350 MB 15-inch 1 MB video RAM U.S.$2,900	PowerPC 7100/80 24 MB 500 MB 15-inch 1 MB video RAM U.S.$4,500	PowerPC 8100/100 32 MB 1 GB 15-inch 2 MB video RAM U.S.$6,800	Type A
– – –	– –	– – – – –	– – – – –	– – – – –	Type B
Price-Driven	Processor Memory DASD Monitor Video Price	Quadra 630 8 MB 250 MB 14-inch 512 KB RAM U.S.$1,800	PowerPC 6100/66 16 MB 350 MB 15-inch 1 MB video RAM U.S.$2,900	PowerPC 7100/80 24 MB 500 MB 15-inch 1 MB video RAM U.S.$4,500	Type C

Source: Gartner Group

Key Issue: What PC hardware acquisition strategies and tactics will ensure the greatest investment protection in the face of rapid, continuous technological change?
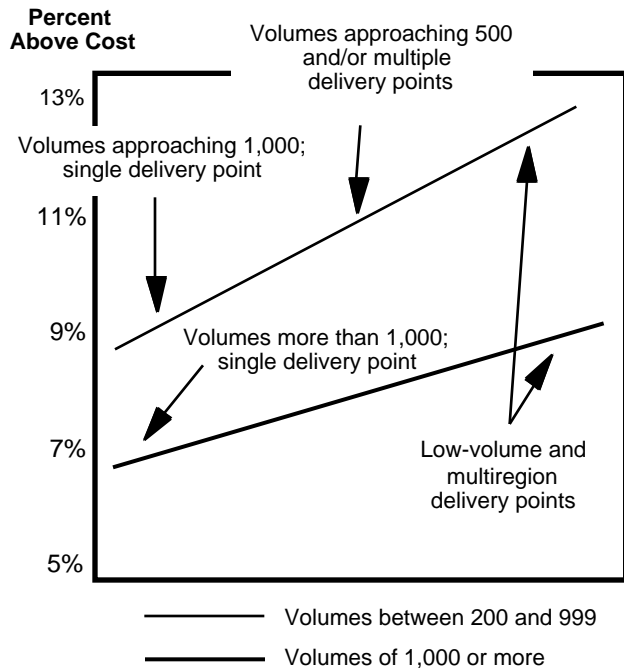
These configurations are for "technology-driven" users (i.e., Type A and high-end Type B companies) and "price-driven" users (i.e., low-end Type B and Type C companies). Organizations with effective migration strategies for moving PCs among users should not use all the configurations listed. Instead, they should focus PC purchases on new technology (i.e., "buying up the curve"), allowing them to acquire the best technology for the users who require the power, and then passing older equipment down the user chain. If properly managed, this methodology will ensure that corporate computing assets will be used most efficiently and effectively.

Much as when the 386 market collapsed during 1993, the death knell for the 486 platform will soon toll. During 1995, Intel will drive Pentium into the mainstream by aggressively pricing microprocessors to original equipment manufacturers. Users will benefit from previously unmatched improvements in price/performance.

Acquiring hardware at the best price will be counterproductive to organizations focused on improving asset management and reducing cost of ownership (0.7 probability).

Maximizing the PC Hardware Investment

Product Cycle ASP

Product Cycles

Price/ Performance Curve

Industry ASP

Time

Projected PC Price/Performance (U.S.$/MIPS for X86-Compatible Systems)

$60					
$50					
$40					
$30					
$20					
$10					
$0					
1994	1995E	1996E	1997E	1998E	1999E

Source: Gartner Group

Key Issue: What PC hardware acquisition strategies and tactics will ensure the greatest investment protection in the face of rapid, continuous technological change?
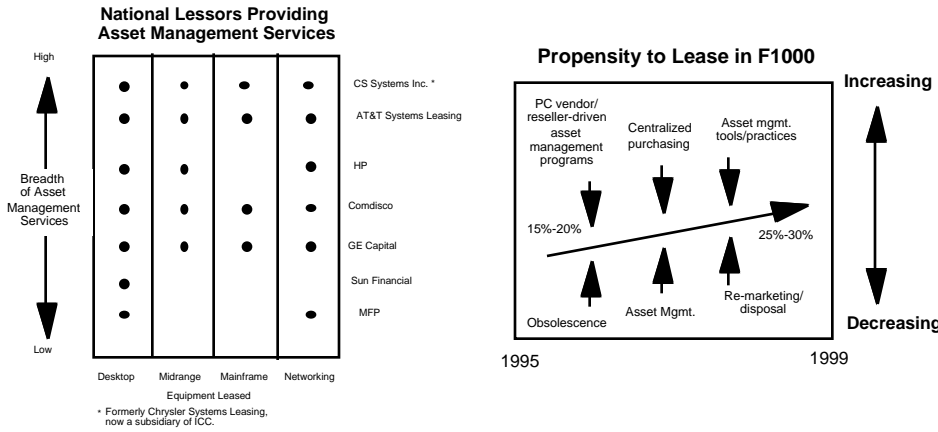
To pay the lowest price possible for PC hardware, enterprises must negotiate effectively with vendors, avoid paying unnecessary premiums, and balance capital spending with the expected evolution of end-user requirements. However, short-term thinking too often prevails. Organizations that focus too heavily on minimizing initial capital outlays by riding product price curves down or by buying into older technology may do more harm than good (i.e., it may actually cost them more in the long run). Continually chasing the power curve will result in suboptimal investments in hardware and higher support and administrative costs (e.g., more potential moves and changes, upgrades, and a portfolio refresh). Organizations should develop a strong understanding of end-user constituencies (i.e., where and what kind of hardware resources are most needed), adopt a forward-looking approach to managing life cycles and portfolios, and buy as far up the price/performance curve as possible to maximize asset life.

**Pricing hardware on a "cost plus" basis will ensure
the continued viability of suppliers (0.7 probability)
and provide price protection for buyers (0.8 probability).**

"Cost Plus" PC Pricing Model

**Percent
Above Cost**

Volumes approaching 500
and/or multiple
delivery points

13%

Volumes approaching 1,000;
single delivery point

11%

9%

Volumes more than 1,000;
single delivery point

7%

Low-volume and
multiregion
delivery points

5%

—————— Volumes between 200 and 999

—————— Volumes of 1,000 or more

Notes

Large European buyers
can use the same pricing
model as U.S. buyers, but
they will generally pay 1
percent to 2 percent more.

Consistent payment in 30
days or less can be
negotiated for a 1 percent
to 2 percent discount.

Shipping charges can be
used as a negotiating point.

Definition: Cost is the actual price paid by the supplier as verified by invoices.
For a reseller in two-tier distribution (i.e., a franchisee or small independent),
the cost basis includes fees to the primary supplier, which can add as much as
3 percent to 4 percent.

Source: Gartner Group

**Key Issue: What PC hardware acquisition strategies and tactics will ensure the greatest
investment protection in the face of rapid, continuous technological change?**

The "Cost Plus" Model for PC hardware acquisition makes the buyer's price for a given piece
of hardware a fixed percentage above the reseller's cost. The advantage to the buyer is price
protection in the form of immediate benefit from any manufacturer price cuts. The advantage
to the reseller is that a fair profit is ensured. The major issues with this model are determining
a fair percentage markup and defining the reseller's cost basis. For large corporate users in the
United States, the markup is between 7 percent and 9 percent based on volume and
geographic concentration. For smaller accounts with 200 units or less per year, the markup is
between 9 percent and 11 percent. European users should expect to pay an additional 1
percent to 2 percent. In one-tier distribution, the cost is determined by reseller invoices from
the manufacturer. In two-tier distribution, the cost basis is the manufacturer's price plus fees
paid back to the franchiser or first-tier aggregator, generally about 3.5 percent. Clearly, it is
less expensive to deal with large, national or pan-European resellers, but users may be unable
to use a two-tier distributor because of their locale or their desire for specific services.
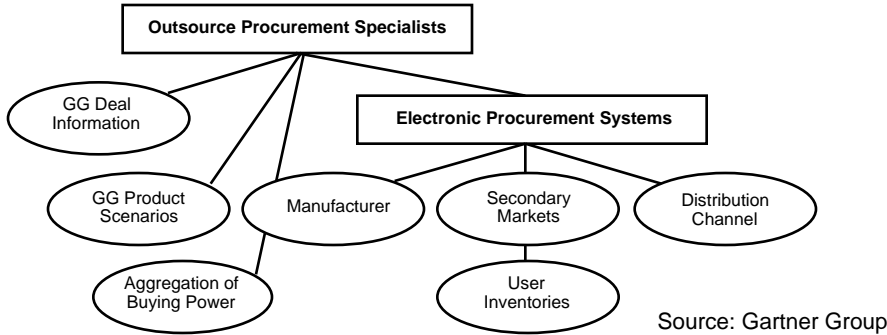
What tools, technologies and management practices will have the greatest impact on PC hardware asset manageability during the 1990s?

Desktop Leasing

National Lessors Providing Asset Management Services

High

Breadth of Asset Management Services

Low

CS Systems Inc. *

AT&T Systems Leasing

HP

Comdisco

GE Capital

Sun Financial

MFP

Desktop   Midrange   Mainframe   Networking
Equipment Leased

* Formerly Chrysler Systems Leasing, now a subsidiary of ICC.

Propensity to Lease in F1000

Increasing

PC vendor/ reseller-driven asset management programs

Centralized purchasing

Asset mgmt. tools/practices

15%-20%

25%-30%

Obsolescence

Asset Mgmt.

Re-marketing/ disposal

Decreasing

1995   1999

Desktop Procurement of the Future

Outsource Procurement Specialists

GG Deal Information

GG Product Scenarios

Manufacturer

Electronic Procurement Systems

Secondary Markets

Distribution Channel

Aggregation of Buying Power

User Inventories

Source: Gartner Group

The primary driver behind the increased propensity to lease equipment in recent years has been matching equipment cost with useful life. Another driver has been the typical user's technology absorption rate. The rate is increasing as users move up the learning curve and, in turn, drive demand for new equipment in shorter, more-frequent cycles. Traditional drivers for leasing still apply, including "off the balance sheet" financing, perceived lower overall costs (when re-marketing is considered), technology rollover and leasing rates that can be molded to fit within budget requirements. The new drivers for leasing equipment are adjunct services, such as asset management, reconfiguration and re-marketing services.

Most IS staffs recognize they must outsource certain functions to maintain focus on core competencies and the desktop is often considered a distraction. Today, most organizations have several individuals devoted to procuring desktop equipment, services and software, without optimal coordination or the assurance that they are obtaining "best-in- class" deals. Electronic procurement systems and procurement outsourcing specialists, though still in their infancy, promise to re-define and streamline hardware acquisition activities.
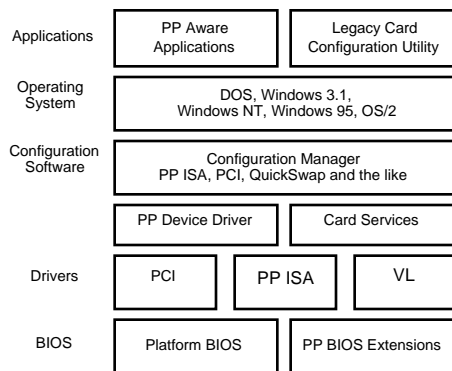

Support organizations will realize no significant savings from Plug and Play (PP) technology until most of the installed base of PCs and adapter boards are replaced (0.7 probability).

PP Components
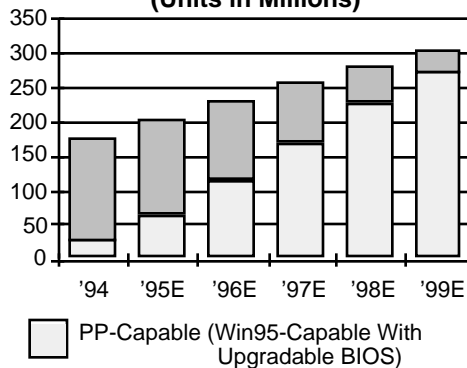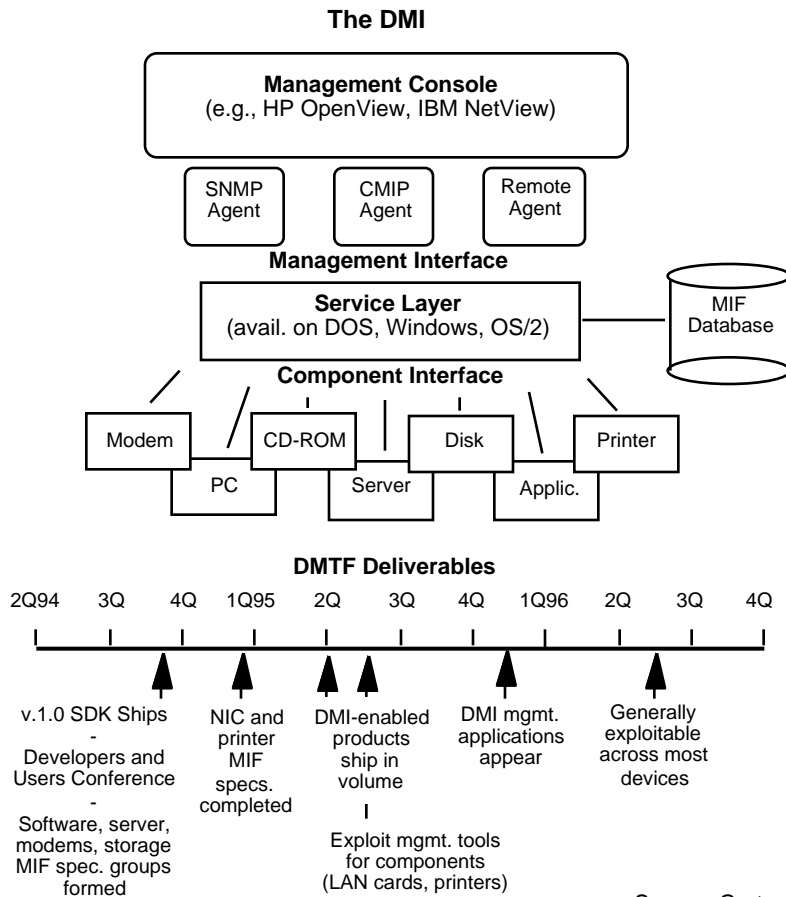
PP-Enabled
BIOS

PP-Enabled
Operating System

True
PP

PP-Enabled
Boards

PP Architecture

Applications	PP Aware Applications	Legacy Card Configuration Utility
Operating System	DOS, Windows 3.1, Windows NT, Windows 95, OS/2	
Configuration Software	Configuration Manager PP ISA, PCI, QuickSwap and the like	
	PP Device Driver	Card Services
Drivers	PCI / PP ISA / VL	
BIOS	Platform BIOS	PP BIOS Extensions
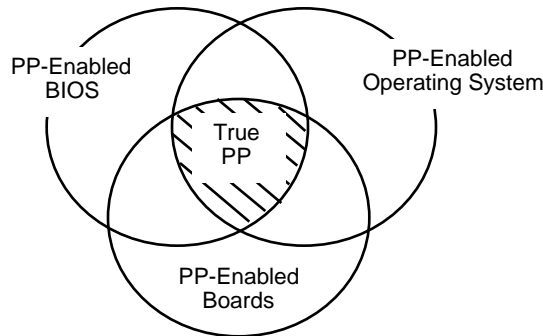
Worldwide X86 Installed Base
(Units in Millions)

PP-Capable (Win95-Capable With Upgradable BIOS)

Source: Gartner Group

Key Issue: What tools, technologies and management practices will have the greatest impact on PC hardware asset manageability during the 1990s?

The Plug and Play specification, developed by Intel Corp., Microsoft Corp. and Compaq Computer Corp., will enhance the supportability and manageability of PCs by allowing users to add and remove Plug and Play adapter boards without having to manually reconcile hardware settings. Dealing with interrupts, DMA channels, serial-port configurations and other hardware settings is time-consuming and expensive (from a TCO perspective). Plug and Play is intended to automate these functions to free the user from becoming a hardware technician. However, Plug and Play in its purest sense is supported only on relatively new PCs (purchased within the past 12 to 18 months) and a small portion of the installed base (approximately 15 percent). Support organizations will realize no significant savings from Plug and Play technology until most of the installed base of PCs and adapter boards are replaced. We do not believe that Plug and Play, with all of its components, will provide as integrated a system as the Apple Macintosh.

Management applications built on the Desktop Management Interfaces (DMIs) will help enterprises reduce PC total cost of ownership by up to 5 percent over five years (0.7 probability).

Reader Notes

The DMI

```
                    ┌─────────────────────────────────┐
                    │      Management Console          │
                    │  (e.g., HP OpenView, IBM NetView)│
                    └─────────────────────────────────┘

              ┌──────────┐   ┌──────────┐   ┌──────────┐
              │  SNMP    │   │  CMIP    │   │ Remote   │
              │  Agent   │   │  Agent   │   │  Agent   │
              └──────────┘   └──────────┘   └──────────┘
                       Management Interface
              ┌─────────────────────────────────┐    ┌──────────┐
              │         Service Layer            │    │   MIF    │
              │ (avail. on DOS, Windows, OS/2)   │    │ Database │
              └─────────────────────────────────┘    └──────────┘
                       Component Interface
     ┌─────────┐   ┌─────────┐   ┌─────────┐   ┌─────────┐
     │  Modem  │   │ CD-ROM  │   │  Disk   │   │ Printer │
     └─────────┘   └─────────┘   └─────────┘   └─────────┘
          ┌──────┐      ┌────────┐      ┌────────┐
          │  PC  │      │ Server │      │ Applic.│
          └──────┘      └────────┘      └────────┘
```

DMTF Deliverables

| 2Q94 | 3Q | 4Q | 1Q95 | 2Q | 3Q | 4Q | 1Q96 | 2Q | 3Q | 4Q |

v.1.0 SDK Ships
-
Developers and Users Conference
-
Software, server, modems, storage MIF spec. groups formed

NIC and printer MIF specs. completed

DMI-enabled products ship in volume

Exploit mgmt. tools for components (LAN cards, printers)

DMI mgmt. applications appear

Generally exploitable across most devices

Source: Gartner Group

Key Issue: What tools, technologies and management practices will have the greatest impact on PC hardware asset manageability during the 1990s?

The Desktop Management Task Force (DMTF) was formed at Interop '92 to develop a standard for managing hardware and software. The result has been the DMIs, a series of application programming interfaces (APIs) that provide a common and consistent way to access hardware and software components. The theory is to embed DMIs into all products (i.e., PC hardware components, peripherals, the operating system and application software) so that automated tools can access standard APIs.

The DMTF has eight full members: Digital Equipment Corp., HP, IBM, Intel, Microsoft, Novell, SunConnect and SynOptics Communications Inc. In addition, there are more than 300 participating members, including 3Com Corp., Apple, AST Research Inc., Compaq, Lotus, Tally Systems Corp., Unix Systems Laboratories, VisiSoft and XTree Co.

Most organizations will be unable to economically or technologically justify in-place PC upgrades (0.7 probability).

Upgrade: Total Cost = $3,001

Hardware Components	Price	Notes
System board	$600	486 DX4-100, local bus
Graphics card	$275	Accelerated SVGA
Monitor	$400	15-inch
RAM	$320	8 Mbytes, on system board
Hard drive	$250	540-Mbyte IDE
Mouse	$50	Microsoft mouse
Software	$140	Windows 3.1 and DOS 6 upgrade
Maintenance	$450	Three years at $150 per year
Upgrade parts subtotal	**$2,485**	

Labor Task	Rate	Hours	Cost	Notes
Needs analysis	$36	0.50	$18	On-site inspection of existing PC
Purchase order/handling	$36	1.00	$36	Customized POs
Hardware install.	$75	2.00	$150	System board, RAM, graphics, hard drive
System software install.	$75	1.00	$75	Windows and DOS
Applications install.	$75	0.75	$56	Network-based, not diskette
Technical support	$50	2.00	$100	Increase due to new hardware during first 90 days
Lost end-user productivity	$28	2.88	$81	50 percent of the "installations" plus supp. time
Upgrade labor subtotal			**$516**	

New Purchase: Total Cost = $2,412

New System	Cost	Notes
New PC	$2,400	IBM PC350, 486 DX-100
Ext. maint. contract (three yrs.)	$240	IBM, two years at $120/year (first year is warranty)
Residual value of existing PC	($300)	Secondary market or charitable tax deduction
New PC hardware subtotal	**$2,340**	

Labor Task	Rate	Hours	Cost	Notes
Needs analysis	$36	0.25	$9	Standardized
Purchase order/handling	$36	0.25	$9	Standard PO
Hardware install.	$75	0.25	$19	Unbox and place on desk
System software install.	$75	0.00	$0	Factory install
Applications install.	$75	0.00	$0	Factory install
Technical support	$50	0.50	$25	Increase due to new hardware in first 90 days
Lost end-user productivity	$28	0.38	$11	50 percent of the "installations" plus supp. time
New PC labor subtotal		1.25	**$72**	

Differences

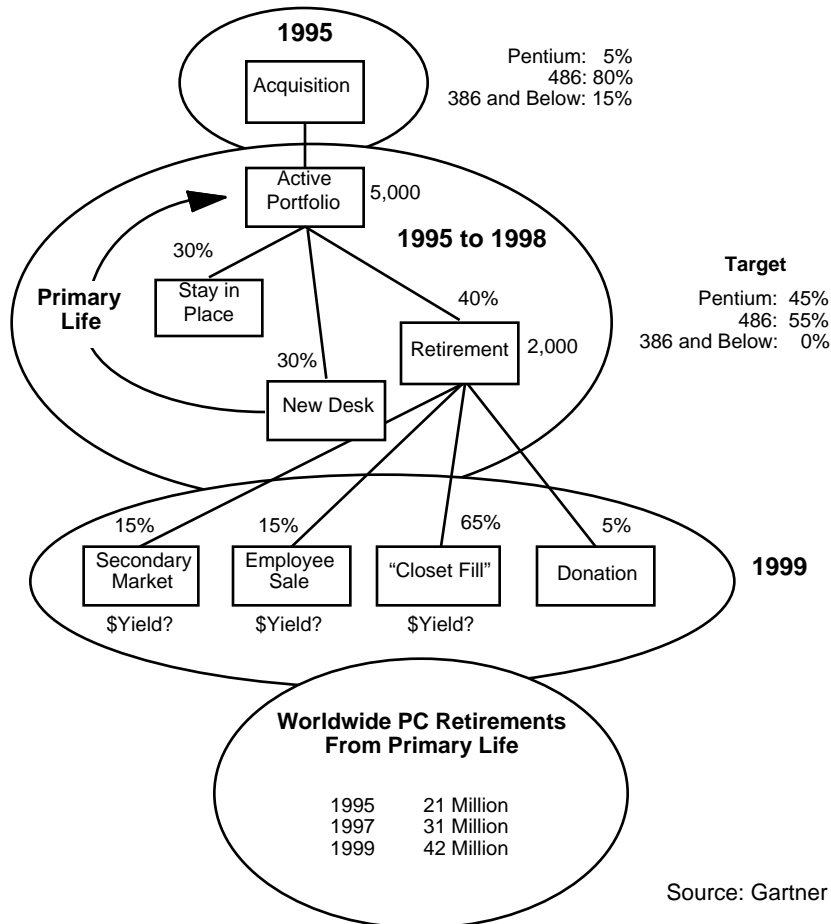|		
Capital	$145	New PC uses less capital
Labor	$444	New PC uses less labor
TCO	$589	New PC less expensive overall

Note: All figures in U.S.$

Source: Gartner Group

Key Issue: What tools, technologies and management practices will have the greatest impact on PC hardware asset manageability during the 1990s?

Millions of installed Intel-based PCs are barely adequate for many of today's environments (e.g., graphical user interfaces, client/server and multimedia) and grossly inadequate for future initiatives (e.g., cognitive user interfaces, desktop videoconferencing and computer-based collaborative work). As a result, many organizations believe that upgrading a PC is an "inexpensive" way to extend its life. However, organizations often find that upgrading a PC is complex and expensive. The component and labor costs associated with upgrading often raise the cost of an upgrade to the level of a new PC purchase. Most components must be replaced during an upgrade, and this constitutes a substantial part of the overall cost. In addition to the initial expense, upgraded PCs have uncertain maintenance options and costs, added administrative complexity and no increase in residual value.

To adequately exploit next-generation software environments, the typical company will have to shed 40 percent or more of its PC installed base during the next three years (0.7 probability).

1995

Acquisition

Pentium: 5%
486: 80%
386 and Below: 15%

Active Portfolio | 5,000

Primary Life

1995 to 1998

30%

Stay in Place

40%

Target

Pentium: 45%
486: 55%
386 and Below: 0%

30%

Retirement | 2,000

New Desk

15% | 15% | 65% | 5%

Secondary Market | Employee Sale | "Closet Fill" | Donation

$Yield? | $Yield? | $Yield?

1999

Worldwide PC Retirements From Primary Life

1995	21 Million
1997	31 Million
1999	42 Million

Source: Gartner Group

Key Issue: What tools, technologies and management practices will have the greatest impact on PC hardware asset manageability during the 1990s?

Advanced system software environments like Windows 95, Windows NT, Mac OS 7.5, OS/2 Warp, as well as 32-bit applications, workgroup and collaborative computing paradigms, and high-performance client/server applications demand increasing power on the desktop. Many firms, however, still depreciate PCs over 48 months or longer. High book values on equipment could hamper new technology uptake for many firms. Migrating to new environments will be costly enough without an additional $1,000 or more write-off for undepreciated equipment. Nevertheless, most organizations must be more aggressive than ever when retiring older hardware technology, or they will be ill-prepared or unable to exploit the benefits of next-generation office environments. Used-equipment sales are unlikely to help justify new investments. In the absence of active and informed management, we estimate that 65 percent of all retired PCs will yield no residual cash value (0.7 probability). In 20 percent of the cases in which cash will be received, the net yield will be negative unless the entire transaction is analyzed (0.6 probability).

Unmanaged PC redeployment will cost an organization with 5,000 PCs more than $1 million annually (0.7 probability).

The Cost of PC Redeployment

Task	Job Title	Labor Rate	Hours Needed Best Case	Hours Needed Worst Case	Total Cost Best Case	Total Cost Worst Case
Needs analysis	IS specialist	$36	0.25	1.00	$9.00	$36.00
Matching process						
Who requires more power?	IS specialist	$36	0.25	1.00	$9.00	$36.00
Who could use old PC?	IS specialist	$36	0.25	1.00	$9.00	$36.00
Coordination	IS specialist	$36	0.50	1.00	$18.00	$36.00
De-installation of PC						
• Technician travel time	Technician	$75	0.25	1.00	$18.75	$75.00
• Backing up hard drive	Technician	$75	0.25	1.00	$18.75	$75.00
• Unhooking/moving to cart	Technician	$75	0.25	0.50	$18.75	$37.50
Refurbishment (on-site)						
• Moving PC to work area	Technician	$75	0.25	1.00	$18.75	$75.00
• Checking and cleaning	Technician	$75	0.25	1.00	$18.75	$75.00
• Reconfiguring hardware	Technician	$75	0.25	1.00	$18.75	$75.00
• De-install/install software	Technician	$75	1.00	2.00	$75.00	$150.00
• Scanning for data	Technician	$75	0.25	1.00	$18.75	$75.00
Administrative tasks						
• Filling out forms	Technician	$75	0.25	0.50	$18.75	$37.50
• Updating inventory system	IS clerical	$28	0.10	1.00	$2.80	$28.00
Moving PC to new location						
• Within same campus	Technician	$75	0.25	1.00	$18.75	$75.00
• Shipping to new location	Shipping co.					$0.00
End-user task disruption	End user	$26	0.00	1.00	$0.00	$26.00
Setting up/checking PC	Technician	$75	0.50	1.00	$37.50	$75.00
Total			**5.10**	**17.00**	**$329.05**	**$1,023.00**

Assumptions: • Handling of the PC is done by a maintenance outsourcer at $75/hour.
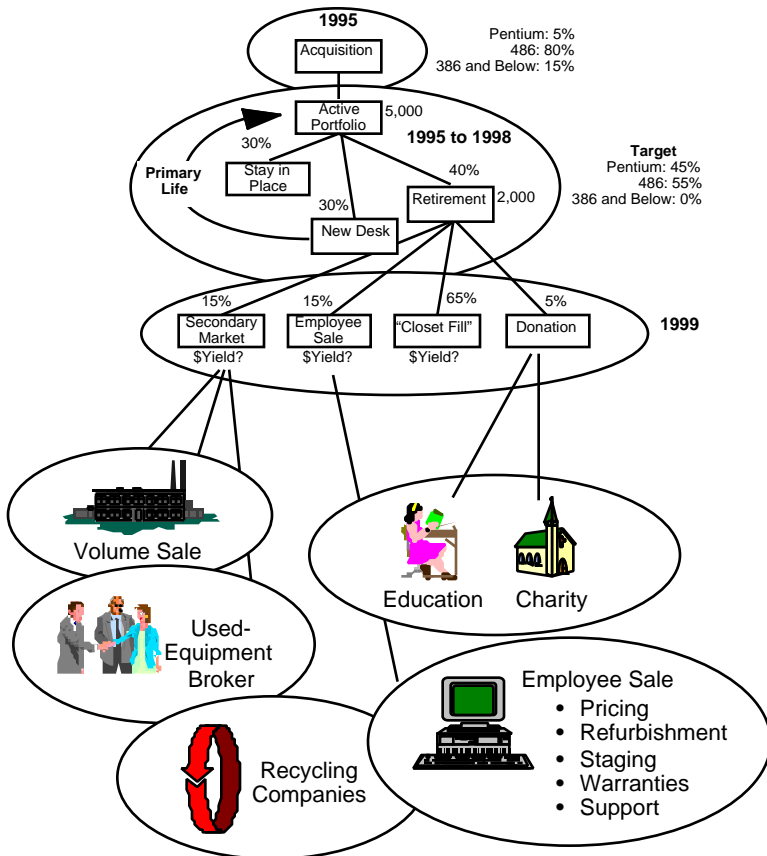• The cost of software or hardware is not included in this model.

Source: Gartner Group

Key Issue: What tools, technologies and management practices will have the greatest impact on PC hardware asset manageability during the 1990s?

One of the most popular techniques to stretch capital budgets and effectively use PCs is to "buy up the technology curve," acquiring a "power user" configuration even though only an entry-level machine is required. Instead of giving the new PC to the entry-level person, the new PC is given to a power user with an aging PC. The power user's old PC is given to the entry-level user — or, alternatively, to a mainstream user, whose old PC is then given to the entry-level user. Although this is a useful and necessary technique to manage the hardware asset base, an unmanaged relocation process can be expensive. First, PC relocations are labor-intensive. Second, there could be a cascade effect whereby one new PC can cause multiple moves, some of which may be unnecessary or result in poor user-to-PC matching. Third, moving PCs without a clear retirement plan may cause an organization to overstretch the life of a PC, either by providing a user with inappropriate older technology or by ineffectively upgrading a PC in the hope of extending its life and value. Finally, poorly planned relocations can disrupt end-user productivity and increase the number of technical-support calls.

Organizations should not overlook or underestimate the importance of a PC disposal strategy. Organizations must understand and carefully assess disposal alternatives.

Source: Gartner Group

Key Issue: What tools, technologies and management practices will have the greatest impact on PC hardware asset manageability during the 1990s?

PC asset disposal presents unique challenges and potential costs that often go unconsidered. Significant volumes of retired assets still go unnoticed, accumulating in storage closets, warehouses and the like. Although temporary elimination is often the most expeditious alternative, it is also the least effective. How these assets will be disposed must eventually be addressed, and it is financially prudent to exploit their fair market value while that value still exists. Employee purchase programs can also be attractive, because they are driven by a captive customer base. Employee expectations should be managed carefully, and enterprises must consider requirements for supporting the systems that it sells to employees. Although it is the most altruistic disposal strategy, donation can also be problematic. Volume transactions are less certain, and the financial benefit received by the giver is often the "net value" (the balance of the remaining tax depreciation), not the fair market value. The best alternatives include using equipment brokers or one of the growing number of PC recycling companies.

- The evolution of system software, application architectures, hardware technologies and business strategies drive continuous migration. Managing the PC hardware base under these conditions will be one of the most challenging and expensive obstacles to effectively managing assets, reducing cost of ownership and realizing IT and business objectives.

- As organizations focus on improving asset management capabilities, PC hardware vendor requirements will change. Vendor selection must be driven less by price/performance and more by the careful assessment of subjective, organization-specific criteria.

- To reduce the asset management burden, user organizations must adopt a life cycle approach to planning PC hardware acquisitions. Short-term thinking and price-driven acquisition strategies will create significant asset management hurdles, increase costs, foster greater complexity, and leave organizations unable to fully leverage PC hardware investments.

- Emerging asset management tools and technologies will help to reduce costs only marginally unless accompanied by a well-constructed PC hardware asset management plan.

- Moves, changes and upgrades within the PC hardware installed base can be extremely expensive if they are not planned and managed carefully.

- Organizations must aggressively retire PC hardware so they can fully exploit the benefits of next-generation office environments.