

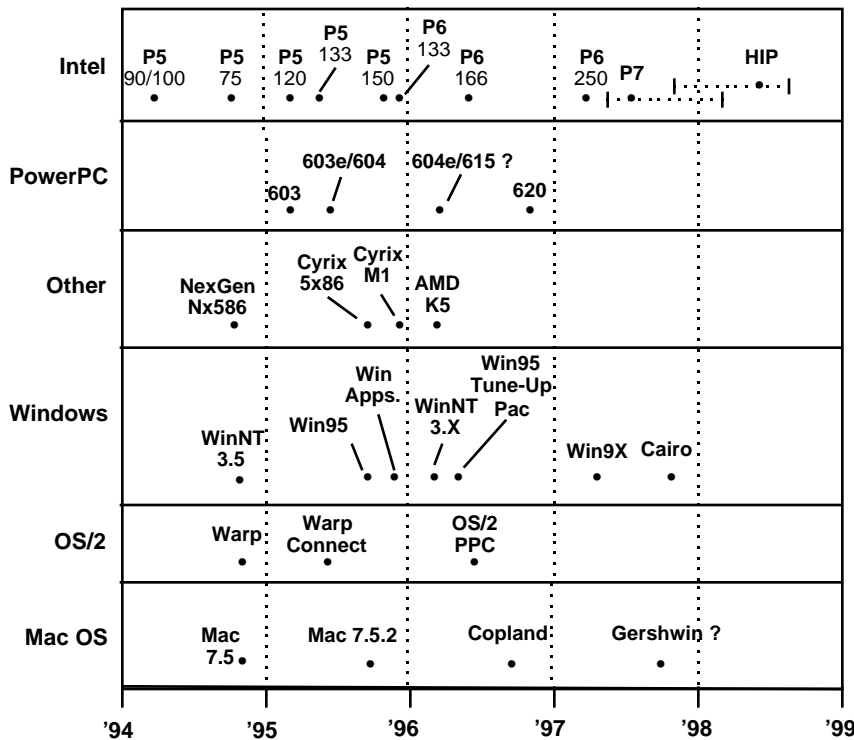
1. What will the end-user environment look like five years from now?
  2. How will IBM, Apple and other contenders challenge Microsoft's market dominance?
  3. How will the repositioning of suites and applications as component libraries and development platforms affect end-user and vendor strategies?
  4. How can users match the growing variety of hardware technology to organizational and user requirements?
  5. What IS strategies can best balance the needs of end-users and enterprise manageability?
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What will the end-user environment look like five years from now?

Reader Notes

Microprocessor/Operating System Time Line



Source: Gartner Group

The PC industry has embarked on a half-decade of continuous migration (from CISC to RISC processors, from 16-bit to 32-bit processors and then to object-based operating systems). Most, if not all, steps will be disruptive and painful. Vendors will try to downplay the migration issues in their products while dramatically overstating the disruptions caused by their competitors' products.

In essence, we are witnessing a continuous wave of PC hardware migrations to keep pace with the simultaneous waves of PC operating system and PC application software migrations. While the resulting change enables greater end-user productivity, we face the issue of either rendering the existing installed base obsolete or supporting multiple environments (old and new). Both bear high support costs.

The wave of migration will not be over until Intel has produced a fully RISC-based processor, and a true component software infrastructure exists on the desktop



Mobile computing, now with the influx of notebooks, will spark the third end-user revolt (0.8 probability).

**Growth of Location-Independent Workers**  
(Enabled by Mobile-Computing Technology)

	Location Dependent	1994	Location Independent	1994
	Attributes	1999	Attributes	1999
<b>Back Office (process driven)</b> 30%	<ul style="list-style-type: none"> <li>Office Bound</li> <li>Telecommuting/ Home-Bound</li> <li>Telemarketing (home or office)</li> </ul>	99% 97%	<ul style="list-style-type: none"> <li>Independent Contractors</li> </ul>	1% 3%
<b>Front Office (transaction driven)</b> 40%	<ul style="list-style-type: none"> <li>Financial Traders</li> <li>Bank tellers</li> <li>Telemarketing (home or office)</li> </ul>	90% 60%	<ul style="list-style-type: none"> <li>Sales</li> <li>Customer Site Activities</li> </ul>	10% 40%
<b>Knowledge Worker (workflow driven)</b> 30%	<ul style="list-style-type: none"> <li>Need Proximity to Large Fixed Capital Assets, e.g., Scientists, Engineers</li> </ul>	65% 35%	<ul style="list-style-type: none"> <li>Analysts</li> <li>Marketing</li> <li>Consulting</li> <li>"Gold" Collar Workers</li> </ul>	35% 65%
<b>Weighted Average</b>		85% 64%		15% 36%

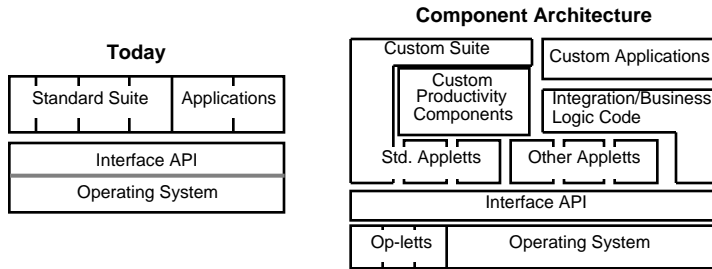
Source: Gartner Group

**Key Issue: What will the end-user environment look like five years from now?**

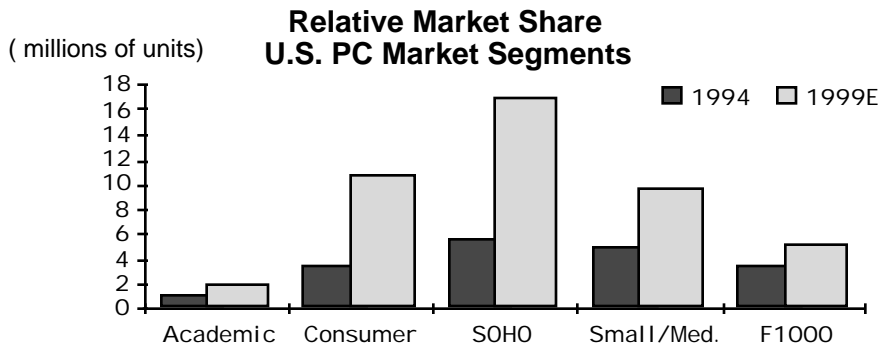
As desktop computing becomes institutionalized, EUC will find new platforms. Mobile computing, now with the influx of notebook computers, will spark the third end-user revolt. (Minicomputers sparked the first end-user revolt, and PCs sparked the second a decade later.) The beginning will be insidious: "All I need to do is get my calendar moved onto the notebook and then I'll never call you again," followed in the next few years by the demand to integrate a series of "one off," nonstandard mobile solutions into the enterprise.



During the next five years, component software will completely transform PC operating systems and software. Applications will become libraries of smaller components, opening the door to customized productivity environments (0.8 probability).



Increasing market segmentation will force PC hardware and software vendors to retreat into narrow niches or support multiple segments that will fragment development resources (0.8 probability).



Source: Gartner Group

**Key Issue: What will the end-user environment look like five years from now?**

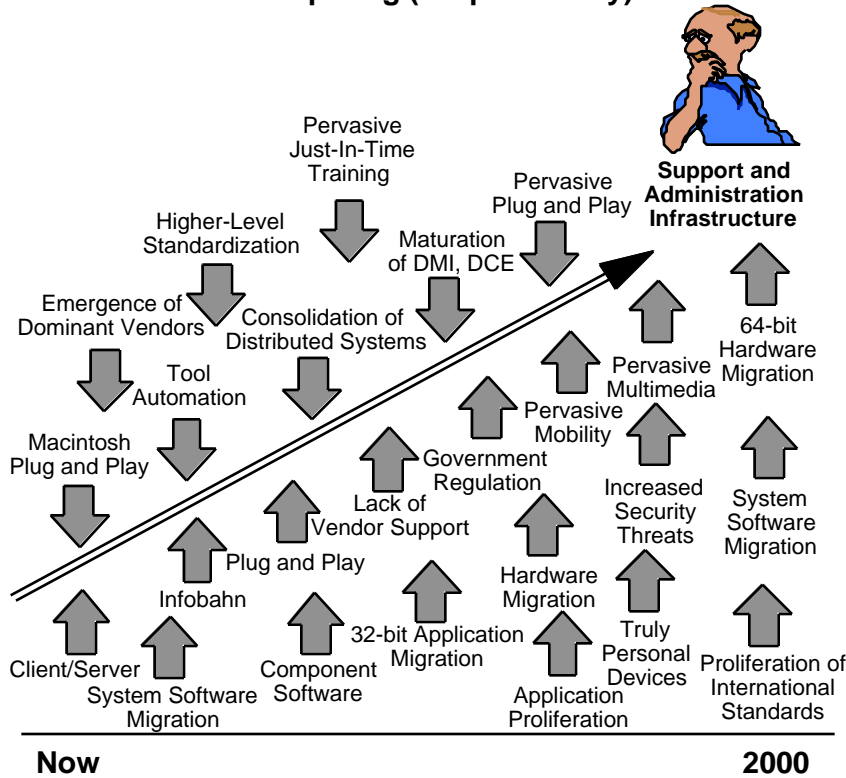
The fragmentation of the PC market will escalate within the planning period. Fortune 1000 companies will no longer be the sole drivers of the PC market as consumer, SOHO, small and medium businesses, and education markets continue to grow in importance. The impact will be felt within the entire spectrum of PC system software, application software and hardware vendors.

*User Recommendation: Corporate users must be vigilant to ensure that their vendors have adequate sources of revenue from a leading share in the market segment or a substantial share across several market segments, and that their vendors do not starve the corporate business platform in the rush to capitalize on emerging PC market segments.*

**Note: 1994 was the first year that PC system sales to the home market (consumer and SOHO) surpassed sales to the business market.**



**Despite advances in systems management technology for distributed systems, technical support and administration costs are likely to rise during the planning period due to increased complexity and new technology initiatives, e.g., component software and mobile computing (0.7 probability).**



Source: Gartner Group

**Key Issue: What will the end-user environment look like five years from now?**

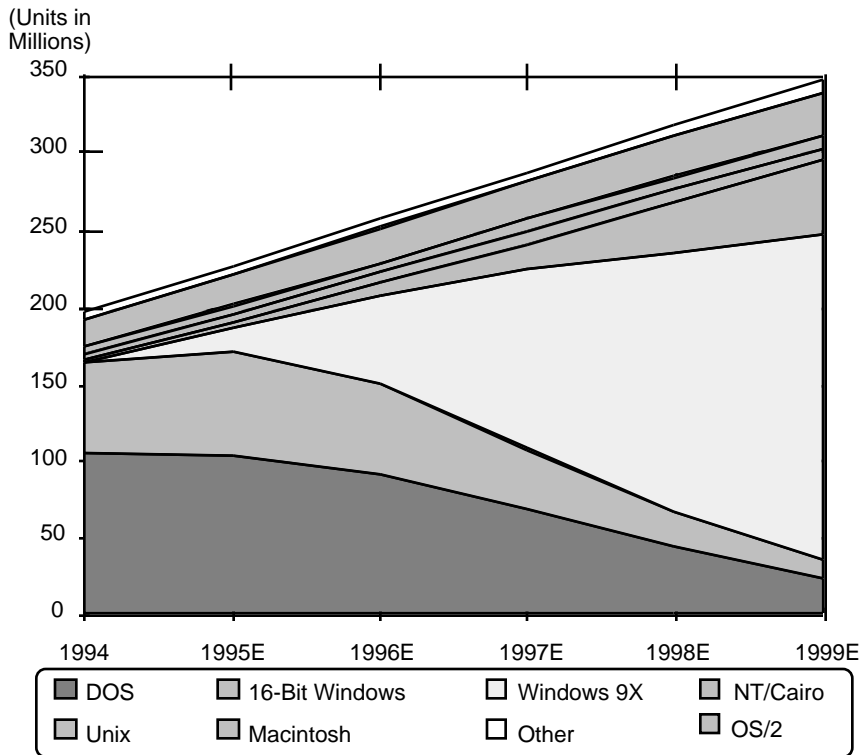
When we feel in control of the world as we know it, the world changes. We see massive change in the technology and usage patterns of desktop technology that will increase the complexity, criticality and risk in distributed technology. These events will have profound implications for support and administration requirements in a world where the adoption of technology will outpace any organization's (except for perhaps the most aggressive Type A and most conservative Type C) enterprises.

We expect that there will be a net increase on demand for human resources, making the adoption of tools that can automate or eliminate human resource demand a strategic imperative. These events are coupled with increasing pressure on the IS budget and head count, concerns about total cost of ownership and the politics of business unit initiatives vs. enterprise manageability.



**How will IBM, Apple and other contenders challenge Microsoft's market dominance?**

**Worldwide PC Operating-System Installed Base, 1994 to 1999**



Source: Gartner Group

Despite the industry's focus on selecting an appropriate operating system to install on the desktop, we believe that one conclusion is inescapable: most organizations will end up with a variety of operating systems installed on the desktop.

As the number and breadth of platforms increase, users will be challenged to bring order to a potentially chaotic desktop population. In the absence of concerted management, user organizations will be populated by a diverse set of end-user platforms, a far cry from the DOS monolith of the last decade.

We believe that it is virtually impossible for most organizations to return to a single operating system at the desktop. Nonetheless, organizations can take a strategic approach to the desktop that minimizes the number of operating systems while retaining those that meet specific goals and are equipped to manage diversity.

Failure to manage desktop operating systems actively will result in increased end-user support and administration costs, and ultimately an overall increase in total cost of ownership.



**PC operating systems are evolving from a pure desktop phenomenon to system software that supports desktops, servers, communication/collaboration, complex multimedia data types and intermittently connected devices.**

### **PC System Software Features Circa 1999**

- **Component Software Infrastructure**
  - enable component-oriented applications
  - allow full substitution of components within the operating system
- **Support Hardware Initiatives**
  - DSP, enhanced video subsystem and 3-D
  - 32-bitness, emerging 64-bitness
  - SMP
- **Advanced File Structure**
  - multiple data type support
  - distributed file system support
- **Cognitive User Interface**
  - adaptive intelligent agents
  - speech recognition (speaker and language independent)
  - universal mailbox/unified message queue
  - proactive social interface
- **Multimedia Support of Complex, Time-Based Data Types**
  - enable full-motion video, videoconferencing
  - voice capture, voice recognition, telephony
- **Security**
  - standard access controls and encryption
  - personalized desktop system/network gatekeeper
- **Multiple-Platform Support**
  - not yet hardware-platform independent
  - available in multiple versions to support mainstream processors

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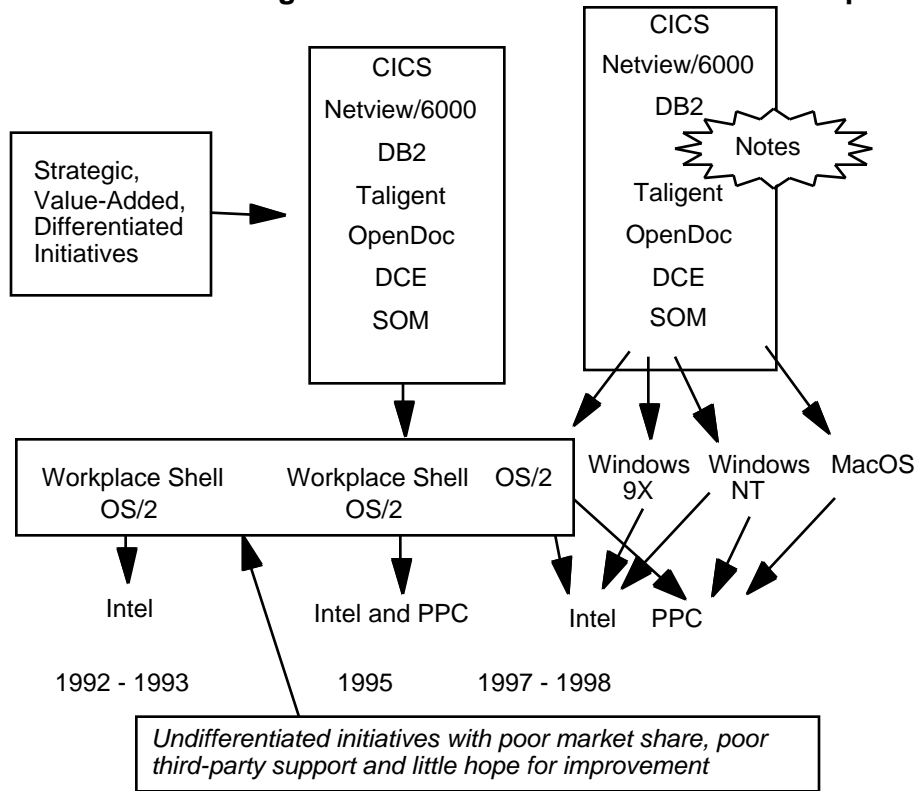
**Key Issue: How will IBM, Apple and other contenders challenge Microsoft's market dominance?**



**IBM will retrench from its desktop-OS/2 focus and concentrate on its differentiated middleware offerings by 1996 (0.6 probability).**

Reader Notes

**IBM's Growing Reliance on Middleware at the Desktop**



Source: Gartner Group

**Key Issue: How will IBM, Apple and other contenders challenge Microsoft's market dominance?**

Ever since the "divorce" from Microsoft, which centered around the issue of which operating system (Windows or OS/2) would be "strategic at the desktop," IBM has focused on the wrong problem. We believe that IBM will realize (by virtue of economic necessity and marketplace reality) that attempting to unseat Windows with OS/2 is a fruitless exercise. If we accept this hypothesis, the question remains — What is left for IBM? The answer is that IBM has many layered middleware products to offer that respect the customers' investment in Windows. The issue for IBM is deciding whether to concede the desktop operating system to Microsoft and do the right thing for its customers (and its business).

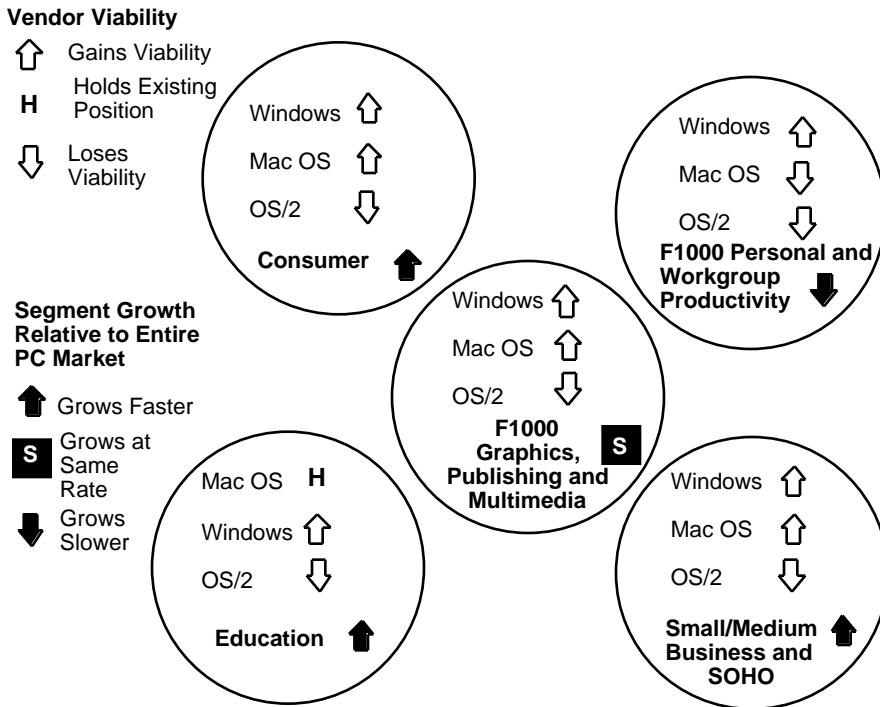
The possible integration of Lotus Notes with IBM's software technology arsenal offers tremendous potential to move the operating system battle to higher ground. Unfortunately, IBM has thus far been unable to leverage its vast array of advanced middleware technologies in its quest to once again influence user architectures. We believe that IBM's lack of vision will ultimately hamper the collaborative Lotus/IBM Notes strategy due to conflicting goals and the "force fitting" of IBM technology (0.55 probability).





Apple will maintain market share in its traditional areas of strength: education, home, small business, graphics and multimedia (0.8 probability). However, in the face of Windows 9X, Apple's share will erode in the F1000 personal and workgroup productivity segment (0.7 probability).

Market Segment Growth and Vendor Viability



Source: Gartner Group

**Key Issue: How will IBM, Apple and other contenders challenge Microsoft's market dominance?**

Windows 9X will finally bring the Windows environment on par with System 7.X in the areas of ease of use and user satisfaction. This factor, combined with the broad availability of applications for the Windows platform, will create a serious challenge for Apple in the F1000 market, resulting in Macintosh share erosion in this segment. The challenge for Apple's customers in the F1000 is to determine whether or not they will use Apple in areas where Apple will retain and enhance its differentiated position, such as graphics, publishing and multimedia.

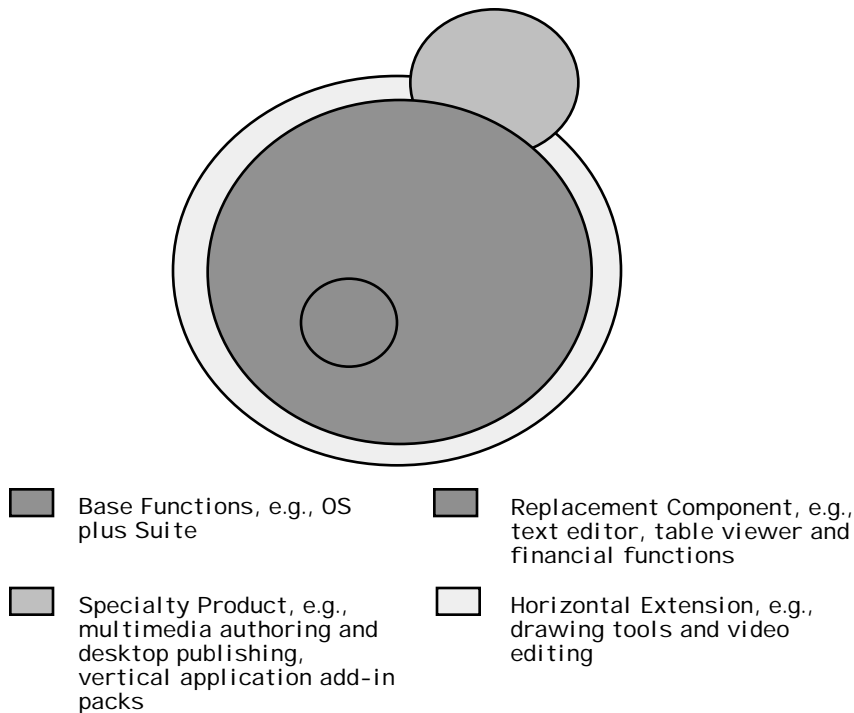
Windows 9X will also make a credible attempt to overtake Macintosh in areas in which Macintosh excels: graphics, publishing, home use and education. We expect Apple to remain strong in these areas. However, we expect Apple to lose some market share to Microsoft's efforts during the next two years.



**How will the repositioning of suites and applications as component libraries and development platforms affect end-user and vendor strategies?**

Reader Notes

**Applications suites will become the base library of components that every desktop needs**

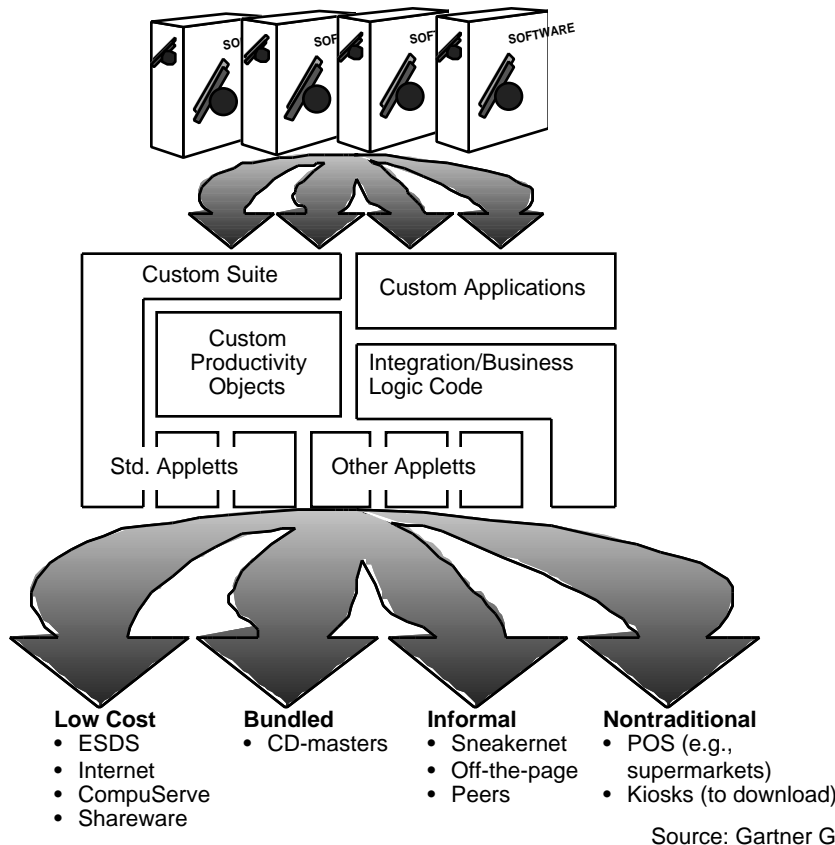


Source: Gartner Group

The base level of functionality that ISVs have been able to assume already exists on the users desktop, and has consistently grown as the PC market has matured. In the move to a component-based desktop, the next level of assumed functionality will be defined not only by the operating system, but by the base functions currently associated with the standard productivity suite applications (0.8 probability). While the suite vendor is concentrating on the core set of functions required by the user, other ISVs must develop a strategy that utilizes the availability of these functions. Apart from the base suite, we believe three distinct categories will emerge: 1) replacement components — the main type of replacement component will be targeted at providing the user with extended facilities in particular areas, e.g., power charting and extended thesaurus; 2) horizontal extensions — certain groups of users will require a range of additional core functionality not provided in the base suite, e.g., advanced drawing capabilities, video editing and fax creation; and 3) speciality products applications that exist today (e.g., multimedia authoring), targeted at a specific niche community that requires extensive features in a specialist area.



**The changing economics of software distribution will force ISVs to focus on low-cost distribution methods, bundling and nontraditional channels.**



**Key Issue: How will the repositioning of suites and applications as component libraries and development platforms affect end-user and vendor strategies?**

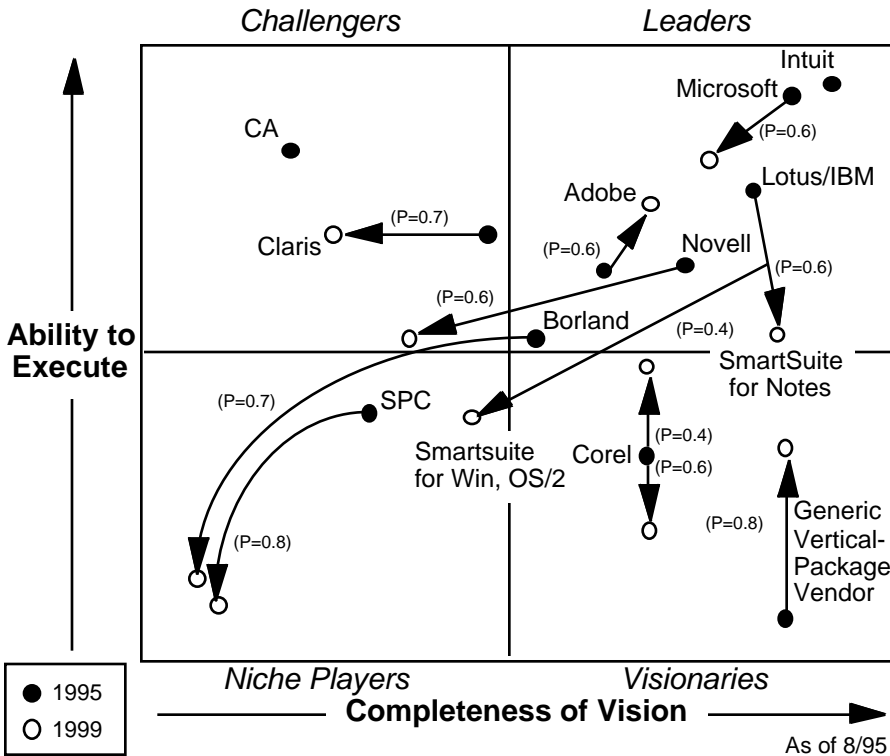
The PC software market has reached a major turning point for vendors. The market is rapidly starting to polarize (in the productivity segment) into two, or at most three companies that can survive in the \$1 billion-plus bracket, with the majority remaining with annual revenues below \$150 million. Most of these smaller vendors will not be able to compete with the few remaining giants for shelf space in traditional distribution channels.

Concurrent with these changes will be the growth in component software, generating large volumes of small applications, some as small as a few hundred megabytes. Creating an individual shrink-wrapped package for each applet would be prohibitive. Bundles of components will be targeted as solution packs for specific markets, with a variety of content and sizes (ranging from point products to full suites).

At the same time, structural changes in the PC market as a whole are creating new classes of users who will demand new outlets in which to acquire their software.



By 1999 the vendor landscape will be fundamentally altered by the introduction of components, the leveraged strength of Microsoft as the leading vendor, and the influence of new platforms.



Source: Gartner Group

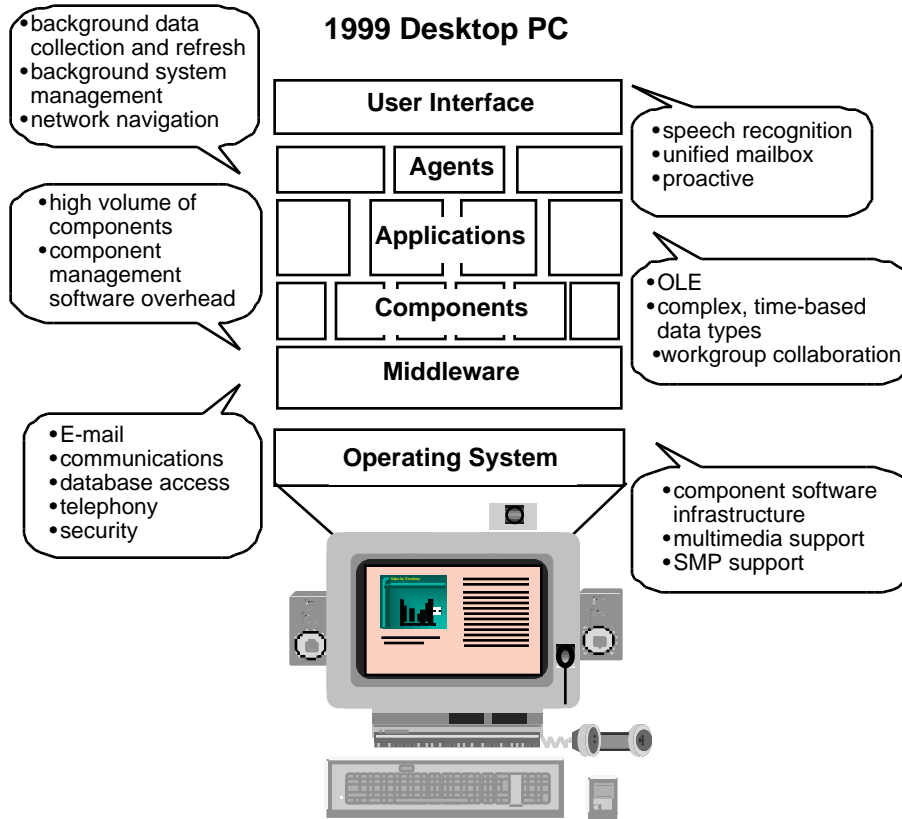
**Key Issue: How will the repositioning of suites and applications as component libraries and development platforms affect end-user and vendor strategies?**

In the planning period, we believe that the intense pressure from Microsoft's dominance in the suite marketplace will either drive the key competitors (IBM/Lotus and Novell) to combine their products into a single suite, or refocus their products as solutions within their own core system software strategies. The remaining mainstream productivity software vendors (e.g., Borland and SPC) that are not involved in the suite market will be forced into a small market niche. The diversity of platforms, and the increased pressure from component vendors, will take a similar toll on Microsoft, which while remaining the leading vendor will lose some momentum in the overall applications arena. Corel, with its newly announced suite strategy, will diverge from its previous focused approach. As a result, we believe that by attempting to compete in this segment, Corel is likely to reduce rather than increase its market influence. With a number of vendors losing significant business, marketing opportunities continue to exist for "product collectors" such as Computer Associates, while the overall componentization shift will also create a much stronger market for vertically focused vendors offering user-customized solutions.



**How can users match the growing variety of hardware technology to organizational and user requirements?**

Reader Notes



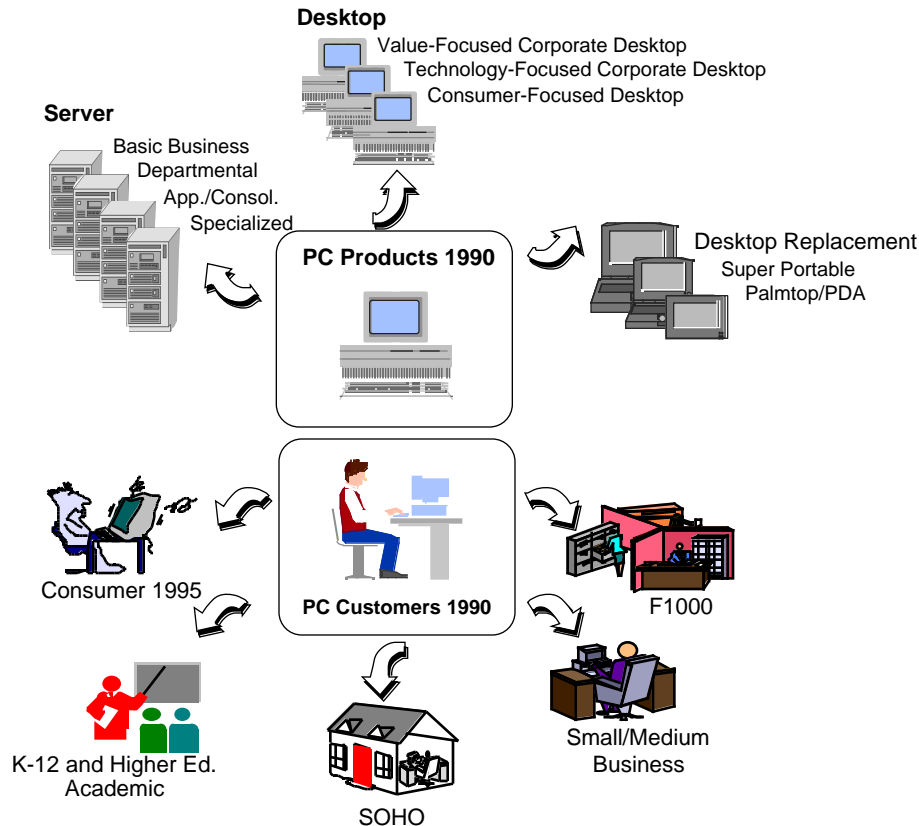
Source: Gartner Group

**1999 Desktop PC Configuration:**

- Processor: 64-bit 500 MIPS RISC-based Digital Signal Processor
- RAM: 64 Mbytes
- Storage: 5-Gbyte hard disk  
12 x 3-Gbyte CD-ROM
- Video: 17-inch screen  
1024 x 1248 resolution
- Sound: 32-bit
- Bus: PCI  
32-bit PCMCIA
- Connectivity: Infrared, Ethernet
- Built in: Microphone, Camera, Telephone
- Price: \$2,500



Development and marketing resources of PC hardware vendors are being spread thin as PC markets and PC product lines continue to segment.



Source: Gartner Group

**Key Issue: How can users match the growing variety of hardware technology to organizational and user requirements?**

The high level of market segmentation that pervades the PC industry is exacerbated in the PC hardware area where product lines are also segmenting. The maturation of PC components, the low cost of entry and the growing saturation of user desktops have led to a slow growth rate and reduced margins on desktop systems, notebooks and PC-servers. On the other hand, the notebook and server markets still have economic barriers to entry (although these are dropping for value-priced notebooks) that limit the number of competitors, continuing unit shipment growth rate and reasonable profit margins. Vendors are finding they must either retreat to a specialized niche, limiting growth potential, or spread across several different markets and product types, thereby risking diluted resources and strategic focus.

*PC hardware customers must be especially diligent to ensure that their chosen vendors remain economically viable and focused within the customers' required market segments and product lines.*





**What IS strategies can best balance the needs of end users and enterprise manageability?**

**IS Initiatives**

**Constituency**

**Value**

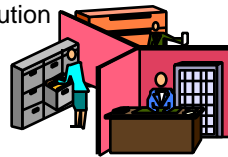
- Handy Templates/Macros
- Distributed Data Sets
- Just-In-Time Training
- Help Desk Automation
- Application Integration
- "Virtual Integration"



**End User**

- Reduce User Effort
- Local Access
- On-Demand Help
- Reduce Down Time
- Reduce Task Time
- Minimize Change Impact

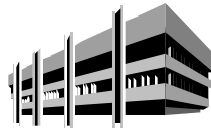
- Electronic Software Distribution
- EDI With Vendors
- Client/Server
- Centralized Servers
- Prototyping/RAD
- VPAs



**Business Unit**

- Latest Version Availability
- Shorten Order/Install Cycle
- Improve Applic. Function
- Reduce LAN Admin. Cost
- Improve Applic. Delivery
- Best Cost/Value

- TCO Analysis
- Distributed Security
- Distributed Backup
- Centralized Support
- Centralized Budget
- HAM/SAM/DAM



**Enterprise**

- Identify Hidden Costs
- Reduce Risk
- Reduce Risk
- Reduce Real Cost
- Improved Planning
- Improved Asset Mgmt.

Source: Gartner Group

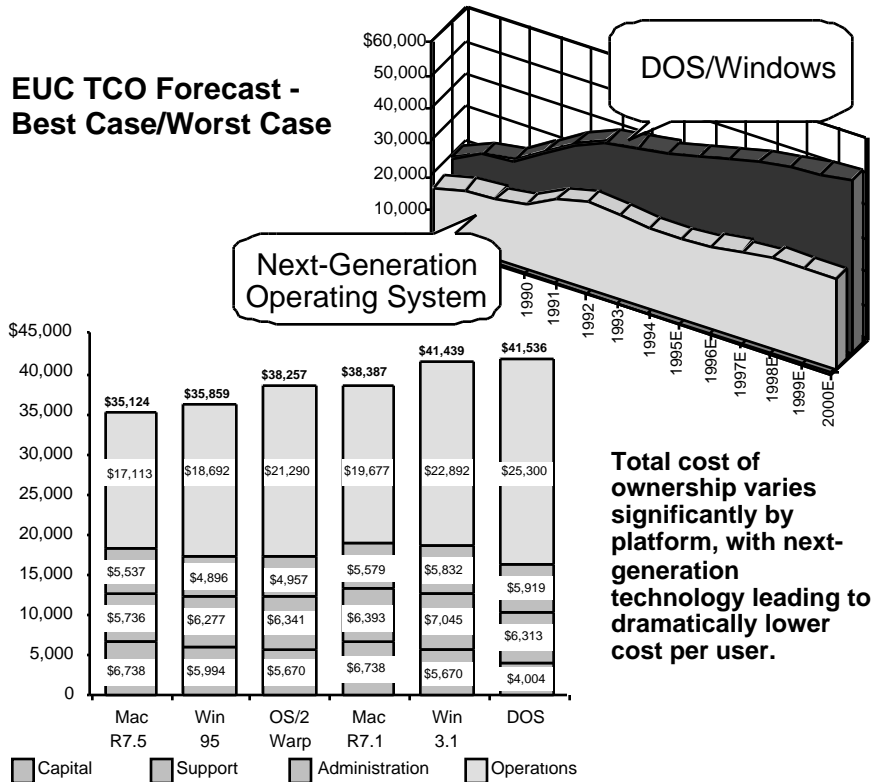
The IS organization is a service provider that is in direct competition with outside vendors. The biggest mistake that the IS organization can make is to assume that it has a captive market. After years of emasculation, it is now poised to regain respect and budget power as custodian of the new "infrastructure." Power plays, however, will not work in this era. The differentiator between the IS organization and vendors is marketing. For all the advantages of being on the inside, vendor hype has won the hearts, minds and wallets of end users. It is time to position the IS organization as a value-added service provider. Services have to be relevant (which means they may need to be reinvented regularly) and must provide clear benefits to the various constituencies.

While the IS organization cannot mandate how IT is to be used, it must, like any sales representative, assess the market and provide products that satisfy a real demand. When the IS organization sees a need where there is no demand (e.g., enterprise security), it must create the demand and then provide the right product.





Enterprises that do not understand the real cost of technology will be poorly positioned to justify and exploit the benefits of next-generation technology (0.8 probability).



Source: Gartner Group

**Key Issue: What IS strategies can best balance the needs of end-users and enterprise manageability?**

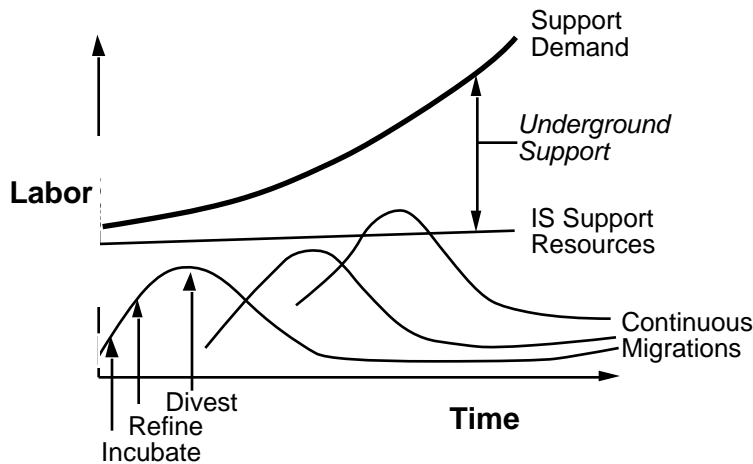
The IT budget is a mandate for how much the enterprise is willing to spend for IT. The “real” budget for IT is the TCO. The TCO is distributed with the technology and comes out of many budgets, much of it unrecognized. We strongly suggest that clients assess the TCO of their respective implementations. TCO can be a powerful funding tool when it is “mined” for projects that reduce costs or increase function delivered for dollar spent.

The TCO of personal computing fluctuates with time, economics, politics and technology. In 1987, a “typical” company’s five-year TCO was \$19,296 for a DOS-based PC. In 1994, this cost rose to \$41,536 for a DOS PC — a 215 percent increase in eight years. While the 1994 system is arguably more functional than the 1987 system, we believe that, because functionality most-often translates into complexity in DOS PCs, the cost per function exploited has increased during this period. Moving to a next-generation operating system is one of many strategic choices available to IS to reduce TCO. Clearly, as this example demonstrates, long-range strategic planning can help contain personal computing costs. *Doing nothing will cause the TCO of PC-based systems to soar. The challenge will be finding the correct balance of end-user freedom vs. enterprise cost optimization.*



User shops must position themselves for a continuous migration where new technology becomes a legacy system that will need to be supported, encapsulated or retired in less than five years.

Waves of Continuous Migration



**Windows 9X:**

- 386 to 486/Pentium replacements →
- Windows 3.1 to Windows 95 upgrade →
- Applications upgrade →

**Macintosh:**

- Motorola 68K to PowerPC replacements →
- Mac OS 7.1 to Mac 7.5 OS upgrade →
- Applications upgrade →

Source: Gartner Group

**Key Issue: What IS strategies can best balance the needs of end-users and enterprise manageability?**

The demand for support will be fueled through the end of the decade by:

- The increasing complexity of the technical environment due to component software, mobile computing and client/server initiatives, downsizing, more sophisticated PC tools and the fragmentation of the asset base.
- The complete connectivity of the asset base, either full-time or occasionally connected. Additionally, more complex uses of connected PCs will be the norm, moving from “simple” file and print sharing to workgroup and collaborative work applications.
- Role changes for PCs, from personal productivity tools to office automation platform to enterprise mission-critical applications platforms.
- The realization that PC assets have to be administered and managed, not ignored.
- The tendency of enterprises not to divest older technologies as new tools are acquired.



**IS must partner with end users, vendors and outsourcers to create a coalition of labor resources and skills for implementing and supporting new information technology initiatives.**

Reader Notes

**Using Vendors to Eliminate “Administrivia”**

**Manufacturers**

- Extended Warranties
- First-Year On-site Service
- Trade-In Programs
- Enhanced Security

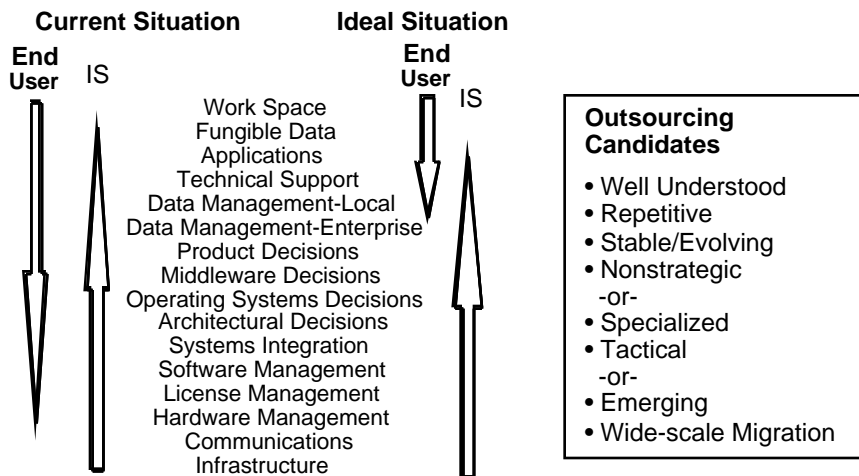
**System Vendors**

- Cradle-To-Grave Support Services
- System Integration
- Procurement Services

**ISVs**

- Simplified License Mgmt.
- Easier Update Mgmt.
- Suite Deals
- Just-In-Time Training

**End User vs. IS Responsibilities**



Source: Gartner Group

**Key Issue: What IS strategies can best balance the needs of end-users and enterprise manageability?**

IS organizations and end-users must realize that IS organizations will probably never have the resources needed to fully implement all IT initiatives. Only by partnering with various interest groups will the IS organization be able to compile a “virtual” staff to cover all requirements.

ISVs, manufacturers and distributors must eliminate administrative burdens. Companies realize that most product segments have reached feature saturation, where adding features will not yield market advantage. Moreover, pricing is no longer a differentiator because of various price wars. Thus, vendors are looking for a new selling point, and reducing administration is a prime target.

Outsourcers are becoming increasingly popular as a means to augment, not replace, IS head count.

Finally, end-users must realize that they are already contributing as much as twice the number of FTEs toward support as IS organizations are. By cooperating with IS’ effort to coordinate resources, end-users can see their FTE contribution decrease.



**• Operating Systems**

Microsoft Windows (in all its varieties) will emerge as the leading PC desktop platform by a wide margin. IBM will be unable to sustain investment in OS/2, and will retreat to a middleware strategy. Macintosh will continue to maintain critical mass, although its principal growth will be in markets outside Fortune 1000 companies.

**• Applications Software**

Component software will completely transform PC applications, moving the industry away from large, monolithic products to component libraries and "solution packs." The surviving vendors, at the turn of the century, will be those that successfully exploit component software, and adapt to the changing economics of software distribution. They may not be the current market leaders.

**• Hardware**

PC Systems in 1999 will be supporting telephony, videoconferencing and voice. Sophisticated applications and user interfaces will thoroughly utilize 500-MIPS systems. Fragmentation of the PC hardware marketplace will place tremendous strain on vendor resources. Users must be particularly vigilant that vendors do not starve their business platform in the rush to capitalize on emerging PC market segments.

**• Policies and Strategies**

The growing complexity of the end-user computing environment, coupled with the predicted continuous migration and new initiatives such as mobile computing and component software, will increase the IS support burden. The good news is that properly implemented end-user computing management strategies have the potential to allow the IS organization to control, and in some cases reduce, the costs of many elements of end-user support.

