WHITEPAPER

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Practices to Lower Cost of Ownership

Today, information technology has moved to the deployment of open standards and PC based infrastructures. The new landscape of computing has PC components as part of the mission critical delivery of services to the enterprise. Along with this movement comes the examination of the total cost of owning those components. Current studies show a wide range of estimated costs to support this technology deployment. What is the basis for this variance? What practices can an enterprise follow to ensure they are getting the lowest cost of ownership of their information systems? This White Paper outlines the practices to lower cost of ownership.

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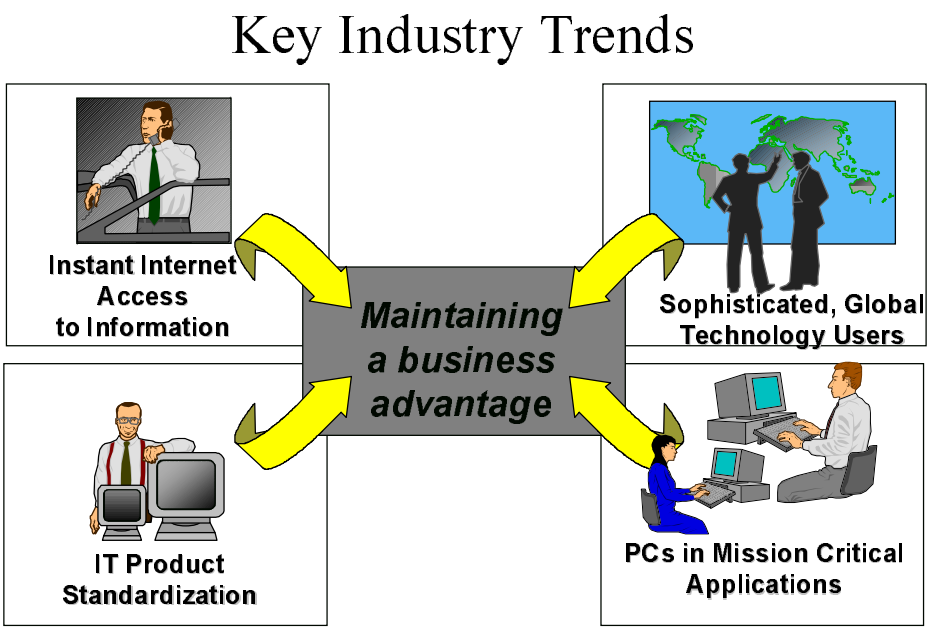
Practices to Lower Cost of Ownership
First Edition (April 1997)

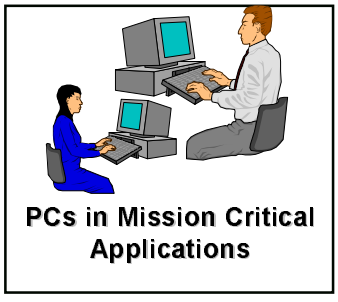
BACKGROUND

The renewed attention to total cost of ownership (TCO) is an outgrowth of new trends developing in the information technology (IT) industry. These key industry trends have lead to two new dimensions of an organization's priority system---total cost of ownership and ownership satisfaction. Understanding these trends provides insight into defining the practices for lowering the total cost of ownership.

Key Industry Trends



The current deployment of information technology is being shaped by five specific trends. These trends are interrelated resulting in allowing companies to maintain a business advantage. The information technology of a business is now viewed as an integral part of the business, and as a result, is measured against the advantage that this gives a business in their market. The four other trends, expanding deployment of Personal Computers (PCs) for mission critical applications, information technology standards, increased globalization, and instant information, are closely linked with creating a business advantage.

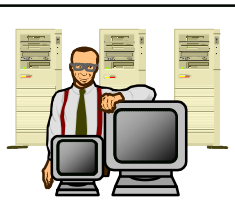


PCs in Mission Critical Applications

There is no question that PC architecture is able to deliver mission critical applications. This trend is fed by the increasing power of the PC platform. The client and server together form a standard information delivery channel. The client is now the window into all of a corporation's information. That window is critical to the operation of the organization. No matter where the data may reside, access to it is dependent upon a PC.

In addition, servers now have the power to handle transaction loads that support entire operations. The availability of redundancy, fault prevention, and fault tolerance features

has removed the risks with the PC architecture across the organization. Mission critical information passes through and is processed on a PC based infrastructure.



IT Product Standardization

IT Product Standardization

PC architecture and power have now allowed standardization across a wide range of the information technology landscape. This change in technological capabilities has spawned a trend towards IT product standardization in hardware, software, vendors, and applications. This now fuels lower costs and less deployment time in deciding what technology to use at various levels within an organization. This standardization also allows for economies of scale in purchasing, training, maintenance, and easier redeployment of resources as business needs change. The same PC can be used anywhere. This trend to IT standardization is necessary to maintain a business advantage as a corporation changes.

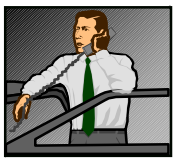
Sophisticated, Global Technology Users

Sophisticated Global Technology Users

Businesses see their markets expanding through the availability of the Internet, which has acted as a tool for global extension of business processes. In the past, the ability to tap into global markets would not have been cost effective. This expansion is enhanced by the current ability to acquire consistent software and hardware around the globe. This allows access from remote locations to the hardware and software platforms that are used throughout the organization.

Part of this trend is to cause more businesses to demand an IT infrastructure to be independent of geographic location; for example, support for platforms must be available worldwide. A standard can not be specific to a geographic area.

In addition, the sophistication of PC users is increasing. As a result they are using PC architecture for more business functions. This increase in functionality is improving end user productivity. At the same time this creates more demands for technical support leading to increased support cost. This creates a need to balance support costs against the increase in end user functionality.



Instant Internet Access to Information

Instant Internet Information Access

The Internet has created more than a paradigm shift in customer requirements--it has created an expectation. The ability to view vast, real-time information presented by the World Wide Web leads end users to expect information within an organization to be just as easily available.

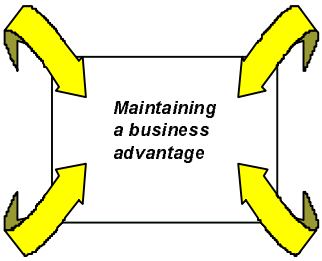
For example, a sales person who is taking an order with required delivery dates needs to know the availability of the product. Batch oriented proprietary systems are frequently out of sync with this need. Perhaps this delivery information is available on a report, which was created yesterday based on data that was consolidated days before. But this same sales person can access the Web and see exact dates and times of movies showing around the country, and then jump to a map that shows the exact street location of the theater.

So now the expectation is set…if we can see this "up to the minute" information on the Web, why do we need to make business decisions on information that is days old? The technology is now available to provide this level of service, and is demonstrated every time someone looks at a Web site. This is a clear trend towards using the Internet to provide business information instantly to a wide audience.

This trend is also driven by networked delivery of information. Internet/Intranet technology is creating a new paradigm for this delivery. World wide de facto standards such as TCP/IP and HTML now make it possible to locate services independent of usage points. You can get the data from anywhere to anywhere.

Businesses are looking for flexibility in the deployment of client side models. For example, many client front ends are specific to the applications business rules logic. With the Internet, the client becomes content neutral, which means the client has no specific knowledge of the back-end application interfaces. This makes providing instant access to business data easier.

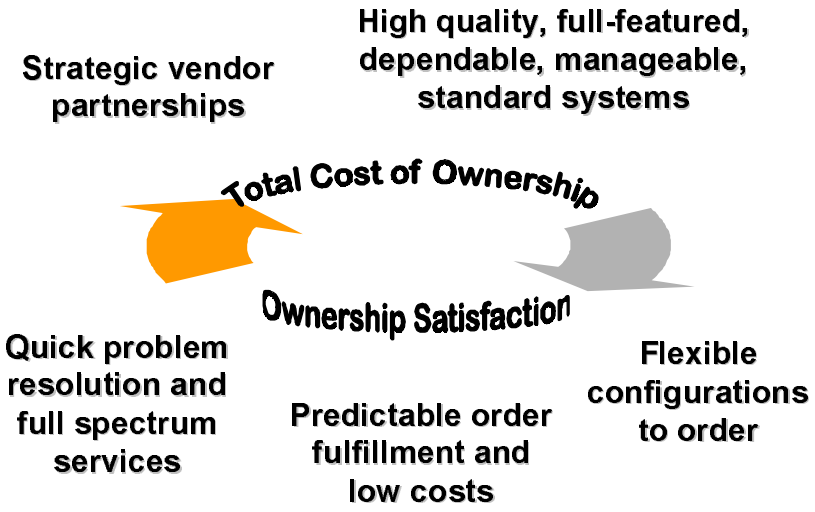
Maintaining a Business Advantage



The convergence of these trends is providing an opportunity to maintain a business advantage using computer technology. Based on Compaq's research, Chief Information Officers (CIO's) are ensuring that IT related costs are being managed relative to a company's overall financial objectives. This business advantage can be in specific cost savings or in a competitive advantage. This trend is the guiding principle directing the other four trends. The implementation of an IT based solution needs to merge with the business activities of the organization. For example, by making production information available to all locations, the marketing groups can close sales without waiting for printed materials to reach their spot on the globe.

To be able to seamlessly change order processing to meet a client's production schedules and tie together delivery with payment creates value. If a supplier can provide this value more quickly than his competitor, that supplier has created value to their customer and created value for their organization. By satisfying and keeping a customer, information technology has become an integral part of every business. The Internet connects those machines without the need to create a new infrastructure for a business.

New Industry Priorities



The industry trends outlined above are driving a significant change in organization's priorities. Organizations are now looking at the "total cost of ownership" as it relates to "ownership satisfaction." This new value system is quickly replacing the old "price" and "performance" dimensions. The new value system supports the trend organizations are facing. For example, total cost of ownership not only includes "price" but additional factors such as support, administration, and technology refreshing costs.

Total Cost of Ownership

Driven by the new industry requirements, the first new dimension to emerge is the "total cost of ownership." This is the entire life cycle cost associated with the deployment and operation of IT solutions required to create a business advantage. Understanding these costs, in addition to the value added, is critical in assessing the return on these investments.

This is the value of owning and delivering a solution to a business need. Knowing the return on this investment leads to an understanding of the life of the solution and all the costs that will be incurred during the life of the solution.

As we will see later, there are different models for understanding the total costs. But independent of the particular model, there is the understanding of this cost as a metric for solutions delivery.

Ownership Satisfaction

Organizations recognize that the old "performance" metric only characterizes the instantaneous speed of a product. But with the new requirements, this is not enough.

Performances in delivery, in management, in quality, in reliability, and in service, are now part of this dimension. Taken together this is "ownership satisfaction".

Ownership satisfaction is the other dimension of the value of computing. For example, buying an appliance at a very low price would move one down the cost dimension. But not being able to buy parts or accessories or getting service would lower ownership satisfaction. This in turn would move the purchase down in the "value" of that decision.

Ownership satisfaction is a measure of the complete relationship with the supplier. High ownership satisfaction requires a high quality dependable, full-featured product. It includes the ability to order what is wanted and to have it delivered when it is needed. High ownership satisfaction includes quick problem resolution and services tailored to the organization's business needs. High ownership satisfaction comes with a holistic view of the specific organization's needs. Relationship driven, high ownership satisfaction requires a strategic understanding of the business advantage that the organization needs.

TOTAL COST OF OWNERSHIP

Given that background let's look at what makes up the "total cost of ownership" in an information technology framework. Since total cost is a financial result of the realities of owning an IT infrastructure, there are a number of ways to account for these costs. In addition, these costs can be affected by the practices of the organization and suppliers, services, and technology chosen. We will look at this to show that these costs are controllable.

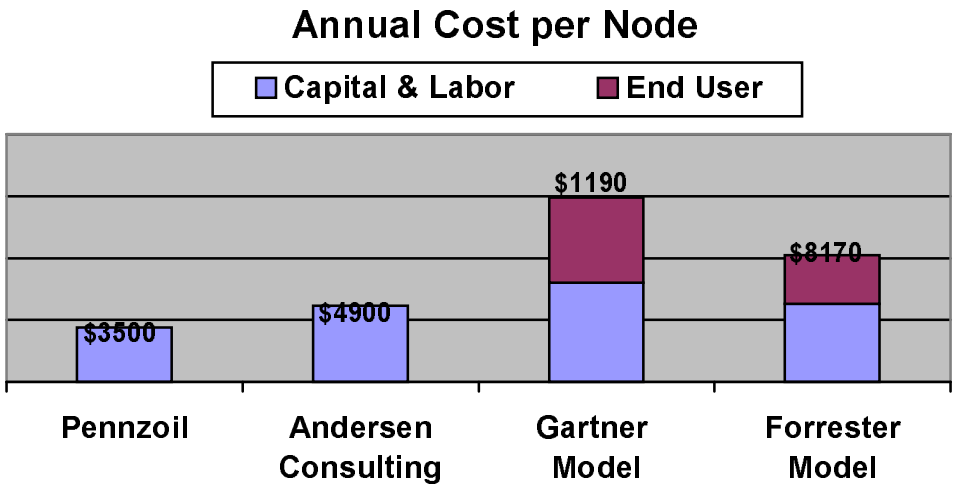
Some Cost Models

As outlined by different analysts, there are different financial models to describe the total cost of ownership. These models are not effective for every information infrastructure. The model used has a large impact on what makes best practices and how costs are allocated within an organization.

Examination of these models demonstrates that the model used carries the value system of the particular organization. For example, the Forrester model includes costs associated with disaster recovery and prevention. The Gartner model does not. The Forrester model, which is expressing its value system, includes a premium on disaster planning, which might be relevant to some organizations but not to others. Both models include costs representing end user activities not related to their tasks, such as changing the Windows desktop, personal Web browsing, or peer support. These end user costs are rarely reflected in corporate IT budgets, but are certainly a real factor.

Therefore, one variable in getting to "total cost of ownership" is the financial model that directly relates to the value system of the organization.

COST COMPARISONS



Note that Pennzoil and Andersen Consulting do not measure end user costs. This does not imply they have been eliminated in their environments.

Costs are Controllable

From industry information and experiences with specific Compaq customers, it is clear that certain practices can lead to significant reduction in ownership costs.

For example Pennzoil has an all Compaq and Windows NT network with over 3,700 nodes and about 200 servers. By implementing well-defined practices, their own audit reveals that it costs $3,500 per year for each node. This compares to the $8,170 per year estimates from the Forrester Group

Another example is Andersen Consulting who has standardized on Compaq products. They have demonstrated for their portables and servers an ownership cost of $4,900 per year.

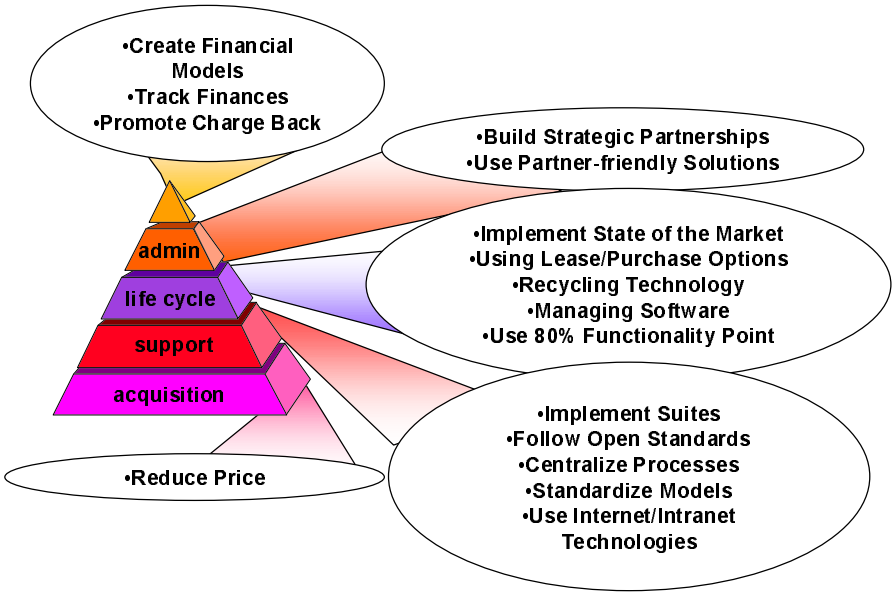
Finally, one financial services company showed an ownership cost for the clients and servers of $6,800 per year. In this case, one of the company's core values is the need for the latest sophisticated technology and are willing to accept the related higher costs. Therefore, their ownership model includes practices to insure efficient deployment of new technology.

The point is, total ownership costs are controllable, and, based on an organization's practices, and value system, the ownership costs can be held to levels consistent with those values.

Importance of Ownership Costs

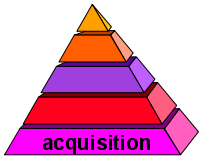
In a Compaq survey, 73% of IT managers and 62% of finance managers agreed that "cost of ownership" is becoming important. However, 30% of financial managers had no idea of the costs, other than acquisition cost, of a personal computer. Information about the "cost of ownership" is not always based on hard data. As shown in the customer examples above, when an organization understands the real costs significant changes are possible.

PRACTICES TO LOWER TCO



Recently, Compaq gathered information on the various practices used by different companies that are Compaq customers in North America and Europe. We also collected information on the rate at which these practices are implemented. Acquisition, Support, Life Cycle, Administration, and Cost Allocation were the most commonly cited practices used to lower "cost of ownership" while maintaining a customer driven level of "ownership satisfaction." As the pyramid above suggests, practices in the area of Acquisition were implemented most often while practices dealing with Cost Allocation, the very tip of the pyramid, were implemented least often. Another interesting point to note is the ease of implementation for the different practices decreases as you move up the pyramid.

The following section discusses the various practices and the implementation rate that these companies are using today to keep total costs low while keeping ownership satisfaction high.

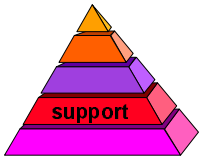


Acquisition

Implementation Rate: 96%

Reduce Price

The most commonly implemented of all best practices discussed in this White Paper revolve around reducing the acquisition costs of PC-based systems. This is primarily negotiating for the lowest possible acquisition price. These negotiations can result in the form of volume discounts or long term purchase agreements, but can also include availability and responsiveness to a customer's flexibility requirements.



Support Costs

Implementation Rate: 75%

Implement Suites

Customers have shown that integration value of software suites is more important than putting together multiple components where each individual software application is best suited for a particular function. This "best-of-breed" approach results in high integration costs to get all components working together. Higher support costs continue as each "best-of-breed" component is updated on its own schedule. A "best-of-breed" solution can even cost more than a custom-developed solution.

Follow Open Standards

Choose the standards that best fit your requirements whether it be operating systems, hardware platforms, or applications. By basing your product selections on industry standards, you can take advantage of the best price/performance value and the broadest array of possible solutions available. By using products based on x86-compatible architectures that use industry-standard operating systems, you can implement the most flexible and adaptable computing platforms available today.

The wide array of options, applications, and solutions available for PC-based platforms and the sheer volume of PC-based platforms sold annually attracts large numbers of hardware, software, and integration vendors delivering innovative products and solutions. Fierce competition ensures continuous improvements in quality, reliability, and price.

Centralize Processes

Increasing the distribution of the IT environment does not imply lowering costs. Some functions are just better handled centrally. As use of PC based systems has matured, there are now better models to understand those functions that are better centralized rather than distributed.

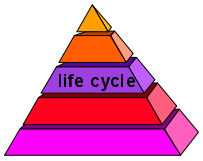
Deciding where functions reside can have an impact on total costs. For example, physical consolidation of network servers can reduce space, administration, and support costs. However, in a geographically dispersed organization, this centralization may actually increase cost and lower performance. Other areas to review would be the centralization or distribution of administrative functions, financial control, and decision making.

Standardize Models

During solution deployment, the creation of a few standard configurations greatly reduces support costs. Gartner suggests that savings through standardization alone are typically 20% of overall labor costs. The end-user can pick a platform that suits their business requirements from a limited number of configurations. By supporting fewer configurations in your environment you can also reduce integration, implementation, training, maintenance, and upgrade costs. With fewer standard models, it is possible to minimize the number of vendors and leverage potential volume purchase agreements.

Use Internet/Intranet Technologies

This practice is almost a corollary of standardizing and deploying state of the market technologies. The Internet has created a mass market for standard protocols such as HTTP, TCP/IP, HTML, etc. that can be used to deliver applications in a global organization. There are potential cost reductions by using the same technologies that are driving the explosive growth of the Internet. This volume of technology has created a mass market that can be leveraged to avoid the costs associated with re-inventing the network infrastructure.



Life Cycle Management

Implementation Rate: 62%

Implement State of the Market

There are costs associated with deploying the newest technology. Integrating "bleeding edge" technologies into your existing environment can require significant costs related to implementation, integration, support, and training.

When planning the deployment of new technology in your environment, consider those technologies with wide market acceptance. For example, using Internet technology for internal application deployment is more cost effective than proprietary solutions that add the burden of support and maintenance to your total costs.

The mass market is creating value in a highly leveraged fashion. This technology allows the deployment of low cost, widely available, support and value added components.

Use Lease and Purchase Options

Leasing can be an attractive alternative to purchasing, and can provide for well-defined costs and distribution of those costs within your organization. However, whether you lease or purchase your PC hardware, there are other "costs" that add to your "total cost of ownership" that need to be understood and controlled.

In addition to your lease or purchase price of a PC, which can be controlled with acquisition practices, you will have costs relating to attaching to you LAN/WAN, software, training, user support, repairs, maintenance, and upgrades.

Whether your PC hardware is leased or purchased, asset management tools are now available which allow you to track an asset through its life cycle. Asset Software International (ASI) has a family of tools for tracking and analyzing complete life cycle costs. A study done by ASI has shown that an average PC on lease can have up to a 28% cost base increase during its lifetime. This is usually the result of additional equipment (NICs & other peripherals, extra memory, hard drives, processor upgrades) and software.

Understanding all the costs involved can help in the allocation and distribution of those costs as well as help you to make lease/purchase decisions.

Recycle Technology

As technology and your business needs change, create plans that allow you to migrate older systems to less demanding applications. For example, you would want to use the most advanced and fault tolerant systems for your mission critical tasks. Previously used systems could then be migrated to file and print servers and, eventually, to communications and gateway server functions. These same concepts can be applied to the client side as well.

Managing Software

One of the areas that can provide significant savings is in managing software for Network Operating Systems (NOS) and applications.

There are two factors that are providing opportunities to reduce cost in the NOS environment.

Servers have become more powerful, allowing more users to be supported on a smaller number of servers to accomplish the same tasks. A server consolidation strategy would depend on how many servers, their physical and organizational locations, and your business needs.

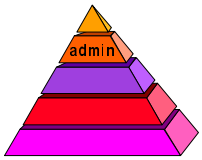
NOS licensing has been changing from a fixed user count model to a flexible one in which you can purchase the exact number of licenses you need. This avoids the situation where you have a server running a 100-user version of a NOS with only 60 users actually attached to the network.

There are similar issues within the applications area regarding licensing. Depending on your environment, it may be more sensible to move applications from the client to the server and match licenses to actual utilization rather than user population. You may find that while you have 200 users on your network, only 150 ever use a spreadsheet application at any given time. In addition to licensing costs, you will also enjoy significant savings in administration, support, and upgrades as well.

Implementing software management solutions can bring software licensing, distribution, support, and updating costs under control.

Use 80% Functionality Point

When implementing information technology solutions, strive to provide 80% of the needed level of functionality. This gives you greater flexibility in selecting "canned" or "off-the-shelf" solutions. Delivering the last 20% of functionality can significantly drive up costs of the solution by requiring custom development. Custom developed solutions often carry additional support and refresh costs which can lead to a higher TCO throughout their life cycle.



Administration

Implementation Rate: 31%

Build Strategic Partnerships

At this level of practice, the organization creates strategic partnerships with critical component suppliers of their information technology. This is an extension of the standardization practice of the previous levels.

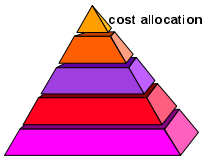
At this level, the organization understands the specific dependencies they have and creates a mutually beneficial relationship with their suppliers. This allows the organization to make long range plans via these partnerships. By working together, costs can be saved by creating smooth transitions of technology.

In addition, these partnerships will avoid the high costs associated with short term "standardized" purchases that effectively leave an organization with a proprietary solution.

Use Partner Friendly Solutions

Selection of strategic partnerships leads to an additional source of cost savings. As additional applications, tools, or systems are acquired, they can be selected based on their relationship to the strategic partners. By ensuring all components are "friendly" to the strategic partners, integration problems, for example, are significantly reduced.

By holding to this practice many support issues with conflicting system components can be eliminated. Simple things like user interfaces will be aligned leading to fewer training costs. New advances in the components can be implemented without creating new integration work.



Cost Allocation and Reduction

Implementation Rate: 6%

Create Financial Models

As described in the *Total Cost of Ownership* section, there are a number of ways to account for costs associated with an information technology infrastructure. The value system of an organization is reflected in the financial model they use. At this level of practice, the organization creates a model to describe what costs are relevant and where they reside.

Financial modeling makes it easier to understand which practices and decisions will be most useful in your organization.

Track Finances

Once an organization creates a financial model, the next step is to capture the costs associated with that model. Organizations like Pennzoil and Andersen Consulting have shown that by capturing all events associated with their IT infrastructure they are able to understand the source of costs and to implement the practices which reduce them. This allows for making informed decisions about new purchases based on the real life cycle experience of existing systems. Often this capture of information is done with the assistance of outsourced services, such as those offered by leasing companies. Products like AssetPro from ASI and Class from Comdisco are good examples of tracking tools that allows for capture and analysis of individual life cycle events.

Promote Charge Back

After standards have been created and adopted, promote those standards, but recognize there are business reasons for non-standard implementation. Allow the user community to purchase the hardware and software they need to accomplish their goals, but charge back for all related costs for acquisition, support, maintenance, impact to infrastructure, upgrades, training, etc. This process creates the financial accountability and responsibility at the point of decision making. The costs associated with a specific decision are made visible, thus leading to choices that take total costs into account.

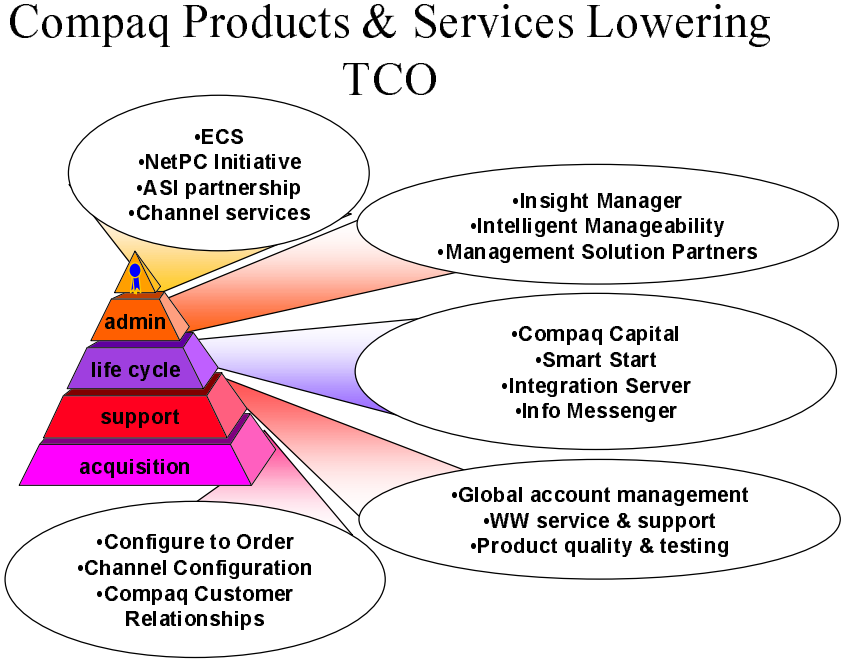
COMPAQ'S COMMITMENT TO LOWER TCO

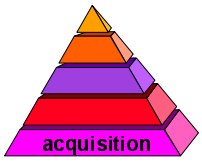
Over the past fifteen years, the personal computer has changed the way businesses have thought about, deployed, and utilized information technology. The PC has evolved from a personal productivity tool to the foundation of mission-critical business applications. PC technology has affected virtually every aspect of the computing infrastructure from the corporate network to the data center. PC-based platforms deliver the adaptability, flexibility, performance, and innovation to allow businesses to respond to their rapidly changing environments.

Compaq is committed to addressing the cost concerns of our customers and to delivering the lowest TCO in the industry. Our focus on TCO and TCO-related issues began long before the Gartner Group and other industry analysts raised the awareness of such issues. Compaq's value model has always been based on reducing the cost of computing through the design and development of high quality, reliable, products with useful innovations that help manage the x86 architecture while partnering with "best-of-breed" industry leaders.

By basing products on industry standards, Compaq gives customers the best price/performance value and the broadest array of possible solutions available for deployment. By delivering products based on x86-compatible architectures that use industry-standard operating systems, Compaq delivers the most flexible and adaptable computing platforms today.

COMPAQ PRODUCTS AND SERVICES





Acquisition

Compaq Configure-to-Order

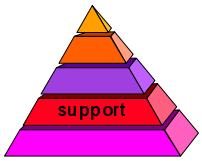
In order to reduce acquisition costs for customers who buy multiple units of the same configuration, Compaq will bring its volume manufacturing abilities to *create* in a configure to order program. This will allow customers to take advantage of Compaq's procurement volumes and efficient manufacturing processes for systems that must be replicated hundreds or thousands of times for a particular IT project, thus driving down the cost of acquisition.

Channel Configuration Program

Complementary to the Compaq Configure to Order program is the Compaq Channel Configuration Program. Many customers require immediate availability of very specific configurations using a Compaq system and third party or custom hardware and software. Compaq's channel partners have sophisticated configuration centers and maintain volumes of Compaq and third party products to enable this capability. By providing modular system design, minimal configurations, and Compaq testing and manufacturing expertise and methodologies to the distribution channels, Compaq will enable the channels to enhance their already quick and flexible delivery mechanisms at a lower delivered cost to the customer.

Compaq Customer Relationships

Many of the most sophisticated IT organizations view their supplier of networked servers and clients as a highly strategic relationship, as critical to the company's success as the factory that makes the product or the consultant that provides the company's services. Often these customers procure thousands of Compaq products in a single year. Compaq has always had dedicated sales and support personnel to address the needs of these large organizations. For some of these customers, however, an enhanced direct relationship can increase the customer's confidence in Compaq's and the channel partner's ability to deliver. This can further reduce both the customer's cost of procurement and the cost of the systems themselves.



Support Costs

Global Account Management

Today's large corporations have workforces that migrate around the globe, and offices doing business in every language, law, and custom in the world. The cost of multiple ways of procuring, maintaining, and administering IT assets in fifty different ways in fifty different countries can bring an information management organization to its knees. To reduce these costs, Compaq offers global account management services to provide for a single, strategic point of contact between Compaq and the customer, and to help customers manage and minimize the inevitable differences from country to country.

World Wide Service and Support

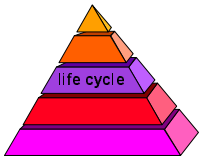
Global accounts have global support requirements. As computing systems become common across the globe, server and support must be consistent everywhere. Compaq has formed a worldwide service and support group to coordinate services around the globe. The first program to address these needs is our Global Systems Services Provider (GSSP) program. Compaq has contracted with Digital's Multi-vendor Customer Service Organization to provide a consistent level of support in all parts of the world. Additional programs will provide instantaneous worldwide access to a common problem solution database, consistent critical parts availability, and common support level by various service providers.

Product Quality and Testing

Exhaustive tests of interoperability are performed with local area networks, communications connectivity, operating systems, applications, and third-party hardware on all Compaq systems. These tests ensure that the customer can deploy Compaq systems confidently, reducing set-up time as well as down time due to system incompatibilities.

Compaq's extensive integration labs provide the foundation for extensive certification testing with leading operating systems, network operating systems, and applications. Compaq's experience led to the development of Compaq's SAP Competency Centers in Waldorf, Germany and Houston, Texas. These centers deliver superior integration value to our SAP customers.

Compaq uses the products it builds along with software developed by our business and strategic partners to run our company. This ensures that Compaq has the same experiences with our products as our customers do, resulting in improved quality and reliability.



Life Cycle Management

Compaq Capital

In January 1997, Compaq announced the formation of Compaq Capital Corporation. The formation of this new company represents a major step in providing Compaq customers with a comprehensive set of financial product offerings that will meet the specific needs of their businesses and help lower the cost of ownership of advanced information systems. Product offerings are initially targeted for introduction in North America in the second half of 1997.

SmartStart

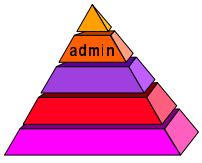
Compaq SmartStart offers customers easier integration, better performance, and lower support costs. SmartStart lowers initial set-up costs by providing one-stop integrated installation for drivers, operating systems, and applications, all of which are optimized for Compaq hardware. This ensures that customers can easily deploy Compaq systems from the time of installation through optimization. Using these tools, MIS managers achieve consistency and uniformity in how servers are set up and maintained.

Integration Server

The Compaq Integration Server acts as a dedicated "code server" on the network and provides a consistent, maintainable source for all tested and approved system software and server configurations. This enables Compaq servers anywhere on the network to be updated with the latest approved configurations supported by network managers and LAN administrators. Targeted servers can be maintained using the Compaq Integration Maintenance Utility, Microsoft Systems Management Server, or Symantec Norton Administrator for Networks. Updates across wide-area networks can be accomplished via the Internet or traditional modem connections. By enabling consistent configurations among servers, and controlled, regular updates of system software, the Integration Server reduces the implementation and support costs of every Compaq server distributed throughout a network.

Info Messenger

One way to minimize support and life cycle costs is to be sure that the correct ROMs, software drivers, and other value-added software and information are available to your administrators and users in a controlled, but timely, manner. Info Messenger makes customers aware of when a driver or other support software has been updated, or when a technical note is available. Compaq Info Messenger proactively notifies the customer via electronic mail when new information, appropriate to the customer's specific hardware and software environment, has been posted to the Compaq web site. Additionally, Info Messenger, like Integration Server, gives the customer the information necessary to make an informed decision about the newly available software, so that changes can be made only when necessary.



Administration

Insight Manager

Compaq Insight Manager, a Windows-based application, provides fault, configuration, and asset management capabilities, making it possible for systems managers to manage hundreds of Compaq servers, clients, and portables from a single location. Insight

Manager also links to Compaq's Integration Server, giving customers Web access to the latest Compaq software, including drivers and ROMPAQs.

Compaq Insight Manager for OpenView and NetView enables systems managers to perform fault management activities on Compaq servers, clients, workstations, and portables from leading network management platforms.

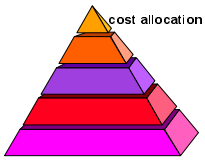
Intelligent Manageability

Intelligent Manageability, a feature introduced by Compaq in 1995, is a core set of features available on all Compaq Deskpro, LTE 5000, Armada, and Professional Workstation products that makes them easier to manage over the network. Features include AssetControl, DMI compliance, S.M.A.R.T. hard drives with pre-failure warranties, proactive tape backup to both local and remote devices, integrated Ethernet NICs that upgrade to 100 Mbs, and a full set of security features. Integration with Compaq Insight Manager provides fault management capabilities for Compaq Deskpros, LTE 5000, and Armadas. These capabilities include management of AssetControl data, management of S.M.A.R.T. hard drive alerts, and network traffic monitoring. In addition, our partnerships with key industry leaders allow us to integrate PC LAN management utilities (for example, Microsoft SMS, Intel LanDesk and Symantec Norton Administrator for Networks) that enable easy management of asset and fault capabilities over the network.

Full-Spectrum Fault Management on Compaq servers is designed to ensure that all possible faults are identified and repaired before significant system downtime occurs. Compaq measures aspects of the health of the system, keeping detailed records of critical system components. These records are reported through industry standard agents and made available to a wide variety of systems management applications

Management Solution Partners

Through Systems Management Partnerships and the Desktop Solutions Partners Program, Compaq works with leading providers of PC LAN and systems management software to ensure that Compaq management information is available to their applications. By leveraging Compaq's industry-standard agent technology, these partner providers can easily support the value-added features in Compaq platforms.



Cost Allocation and Reduction

ECS - Compaq Enterprise Consulting Services

Compaq Enterprise Consulting Services is chartered with assisting customers with their mission critical technology initiatives, specifically by:

- Transferring knowledge to enable customers to confidently implement and maintain a solution, and
- Maximizing business value provided by technology

Although small by design, Compaq ECS expands its abilities by actively leveraging its strong relationships with industry partners. Through Compaq ECS, customers can be assured of receiving optimal recommendations based upon their requirements.

NetPC Initiative

Compaq is one of the leaders in developing the new standard for managed network PC's--the NetPC. Working with Intel and Microsoft, Compaq has designed a new standard for a sealed-case, highly manageable computer, and is testing the design in real world customer implementations. A compact sealed case design minimizes the risks of component theft and addition of non-standard internal options that could increase support and administrative costs. By utilizing the Win 32 standard for applications, an organization can leverage its investment in software and training. But by working within the Zero Administration Windows (ZAW) structure, an administrator can manage those applications and the entire user environment from a server, thus reducing support costs, the costs of software changes, and administrative costs. A Compaq NetPC will be able to provide the cost savings advantages of a sealed case as well as utilization of ZAW to lower costs where a highly controlled user environment is appropriate for the IT task at hand.

ASI Partnership

Asset Software International, producers of AssetPRO asset management software and AssetREGISTRY loss prevention database, has already been a partner with Compaq in the Intelligent Manageability Solution Partners program. Compaq recognizes that organizations that use AssetPRO are among the most sophisticated and most successful in controlling costs, because they have taken a systematic approach to IT asset procurement, measurement and management of cost events. Consequently, Compaq works closely with ASI to make Compaq computers more easily managed by AssetPRO and other ASI products, and to make the benefits of ASI's products more readily available to companies that wish to better measure and manage their IT assets.

Channel Services

By leveraging the industry's most extensive reseller and service provider network, Compaq customers can obtain the level of local, regional, country or global service that best fits their needs. Compaq resellers, integrators and service providers offer everything from procurement services to complete out-sourcing of IT management. By maintaining a relationship with a Compaq reseller, the customer can be assured of receiving rapid and appropriate levels of support, at a cost to match the business needs driving support requirements. In the United States alone, Compaq has over 36,000 reseller sales personnel, 44,000 systems engineers, and 16,000 service personnel.

COMPAQ MANAGEMENT SOLUTIONS: KEY ENABLERS FOR CONTROLLING COST

Managing distributed enterprise ownership costs requires practices that standardize products and solutions, centralize operations to gain efficiencies, manage your distributed software and use strategic partnerships to ensure well integrated solutions. Since 1990, Compaq has led the way in making its products the most manageable in the industry by building in manageability, providing easy-to-use, proactive management software for efficient operations and partnering with the leaders in systems management to ensure complete management solutions.

Standardizing Management Solutions

By standardizing the processes and tools for systems and network management, support costs can be lowered. Recognizing this requirement, Compaq has based all of its

management products and features upon open, industry standards including the Desktop Management Interface (DMI), the Simple Network Management Protocol (SNMP), TCP/IP, IPX and Point-to-Point (PPP) network protocols, and the S.M.A.R.T. disk drive standard. These standards and others are crucial in enabling managed elements to share status and information with multiple management tools across networks.

Compaq is a leader in developing management standards as shown in its steering committee membership on the Desktop Management Task Force (DMTF). From its position on this and other key technical committees, Compaq led the development of the DMI Standard Systems MIF, based upon Compaq's SNMP work for its servers. Working with key disk storage vendors, Compaq drove the development of the pre-failure alerting and status monitoring capabilities of the S.M.A.R.T. disk drives, now an industry-wide standard. And as distributed computing has moved from client-server to Web-centric models, Compaq again led standardization efforts by starting the Web-base Enterprise Management (WBEM) initiative. Partnering with Microsoft, Intel, Cisco and BMC, WBEM will use the Web-centric computing model to enable networked delivery of management information and management control. WBEM tools will be based on universal Web standards such as the (HTML) and (HTTP) and emerging Web-based management standards such as the DMTF Common Information Model.

By leading efforts to standardize systems and network management, Compaq is working to drive down the cost and complexity of distributed management.

Centralized Management Functions

As networks continue to grow in size and complexity, efficiency can be maintained by centralizing management functions. Compaq created Compaq Insight Manager expressly to enable monitoring and control of hundreds of clients and servers from a single point. Operating from a Windows 95 or Windows NT console, Compaq Insight Manager can discover, gather status, configuration and performance data from all the Compaq clients and servers on a distributed network. Its powerful monitoring capabilities enable Compaq Insight Manager to alert you to potential and actual problems with systems, then take required actions to maintain or restore operations. For servers not connected directly to the network, the Remote Insight board enables Compaq Insight Manager to remain in contact and control. Remote Insight constantly monitors the health of the server and when troubles arise, can both page administrators and call a modem-equipped Compaq Insight Manager console to deliver trouble alerts. Administrators can take direct control of the server using Remote Insight's remote console capability. Compaq clients and servers can also be monitored easily in the very largest of enterprise networks with Compaq Insight Manager for OpenView and TME10 NetView.

Proactive Software Management

Implementing management solutions that automate software configuration, installation, and distribution are also crucial in controlling distributed network costs. Compaq's integration management products and partnerships with leaders in network inventory and software distribution enable a wide choice in products for installing and maintaining clients and servers.

Compaq Integration Management supports a life cycle approach to software management. SmartStart and Integration Servers enable users to establish and maintain standard server software configurations. The Compaq Info Messenger Internet-based service provides up-to-the-minute information on available software updates from Compaq. Compaq Insight Manager's Integration Maintenance feature uses the Internet

to gather software updates from Compaq. Compaq software subscription services including Compaq Support Software CD for Portables, Desktops and Professional Workstations and Compaq SmartStart Subscription for servers deliver updates in CD-ROM form to users.

Compaq Quantifies Cost Reduction

Compaq's management strategies outlined above, result in quantifiable benefits. An IDC research study shows a 27% decrease in support personnel travel directly attributed to implementation of Compaq's management features.

The amount of time to support end users was reduced 87 hours per 100 users. Customer's reviews have shown 24% fewer servers have unplanned outages after the implementation of management features. This relates to 50% fewer end users being effected by unexpected server outages.

FINALLY

Industry trends have moved the computing industry to a key position in maintaining an organization's business advantage. This in turn has developed two new priority dimensions—"total cost of ownership" and "ownership satisfaction." As described above there are practices that can be used to directly lower ownership costs.

Compaq understands these practices in the industry and has created products and services to support every level of these practices.

But more important, Compaq understands the underlying customer priorities. Compaq has crafted these offerings with ownership satisfaction in mind. Compaq is creating solutions properly aimed at raising ownership satisfaction and lowering ownership costs.

So no matter which way you look at it, Compaq costs you less.

SOURCES AND RESOURCES

For more information on Compaq Computer Corporation and TCO visit Compaq's web site at WWW.Compaq.com.

For more information on Asset Management, AssetRegistry, or AssetPRO, you can visit Asset Software International web sites at **WWW.AssetREGISTRY.com** or **WWW.AssetPRO.ca**. You can also contact Asset Software International at one of their three main offices:

ASI HQ 6 Antares Drive, Suite 200 Ottawa, Ontario Canada K2E 8A9	Phone: 613-723-7374 FAX: 613-723-8549
ASI United States 306 Wall Street Princeton, NJ 08540 , USA	Phone: 609-430-0775 FAX: 609-490-0785
ASI Europe ASI House 3 Union Court, Richmond Surrey, TW9 1AA United Kingdom	Phone: 0181-332-1444 FAX: 0181-332-2777

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