

1. Where is the mainframe data center headed?
2. What will the success of new computing platforms mean to the data center?
3. What should data centers be doing now to survive and flourish in the future?

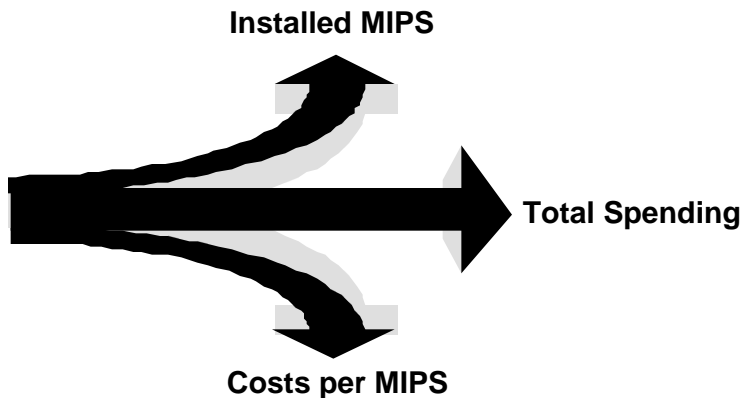
The traditional data center is undergoing rapid, major changes. The mainframe price/performance curve is steeper than ever, and still, newer technologies offer attractive cost scenarios. Islands of computing proliferate throughout the corporation, dispersing resources that once would have been under the control of the data center. At the same time, there is renewed appreciation for the skills and practices refined during the data center's long history: security, systems management, scheduling and the rest. The data center organization finds itself called upon to perform these tasks in the new environment of client/server computing.

This presentation looks at these changes and at how some data center organizations are reacting to (and even leading) them. We first address the mainframe data center and the steps companies can take to make it as efficient as possible. We then examine the forces for change and what they mean to the long-term survival and success of the data center. This presentation is meant to be a "call to arms," a message to data center management that there is a great opportunity awaiting those who can seize the initiative and lead the corporation into a new era of computing, productivity and value.



The cost per unit of work processed in the mainframe data center will decline 15 percent annually through 2000 (0.8 probability).

Reader Notes



Source: Real Decisions, a Gartner Group company

Key Issue: Where is the mainframe data center headed?

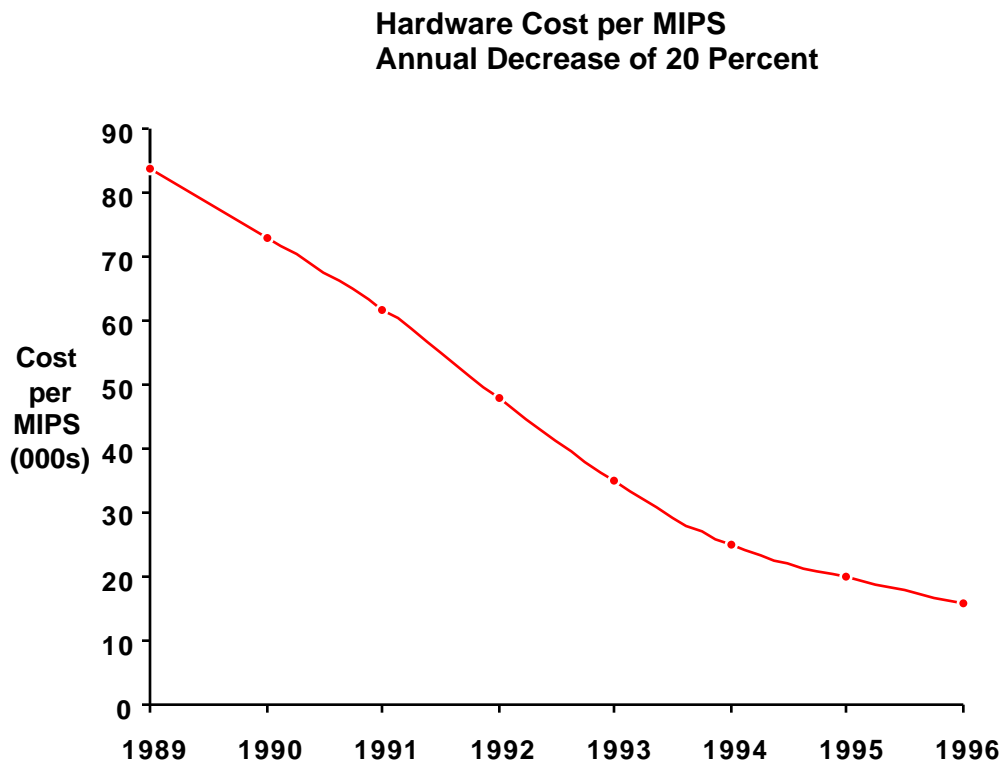
Despite the explosion of client/server computing, annual growth in mainframe utilization is still very much a part of the IT landscape. Recent history shows annual increases in mainframe MIPS of about 20 percent for Real Decisions' clients. Coupled with flat or actually declining budgets, this means annual declines in costs per MIPS of at least that percentage. Looked at another way, the value of each dollar spent on the mainframe is increasing. Looking ahead, we see this trend continuing, though at a slower pace.

Steeply falling mainframe prices, continuing progress in automation and further data center consolidation will maintain the downward pressure on costs. Business expansion means more activity in processing legacy systems on the mainframe. Even new client/server systems can mean increased work on the mainframe: Corporate data will largely continue to reside there, and systems that make querying that data easier lead to more demand on the mainframe as a server.



Hardware cost per MIPS continues to fall.

Reader Notes



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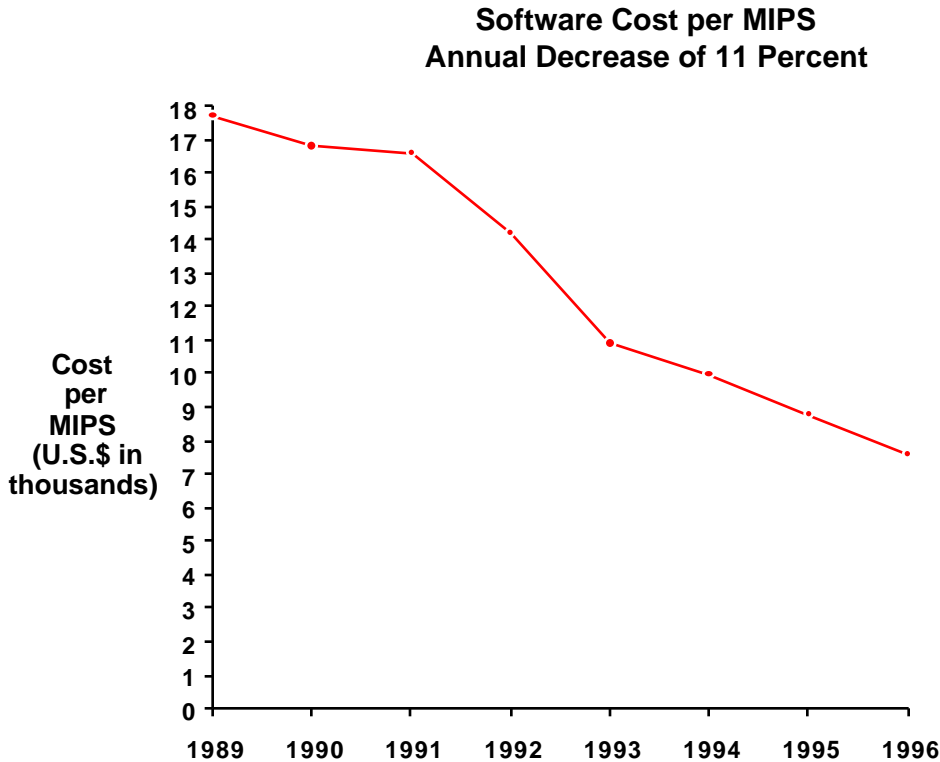
Falling prices and growth in demand have made data centers' unit costs decline steadily. Annual operating costs for hardware (lease, depreciation and maintenance) per MIPS installed continue to fall more than 20 percent per year. The integration of CMOS-based processors into the data center will help extend this decline; we see a 30-percent annual price/performance improvement for the next several years. The above curve will not match that rate, since not all companies will replace, or add to, their mainframe capacity, but it will keep falling.

Beneath this overall improvement there is a wide range of performance among data centers. Those who are most successful at keeping hardware costs low follow one or more key strategies. Market intelligence is critical: cast a wide net for alternative deals, identify the best price point and act to lock it in. The other side of the coin is utilization forecasting and systems performance tuning. Squeezing six more months of acceptable performance out of the existing capacity can mean considerable savings when the next upgrade is done. Flexibility among storage media can pay off as well (e.g., using tape as DASD or fiche replacement).



Software cost per MIPS declines at a slower rate.

Reader Notes



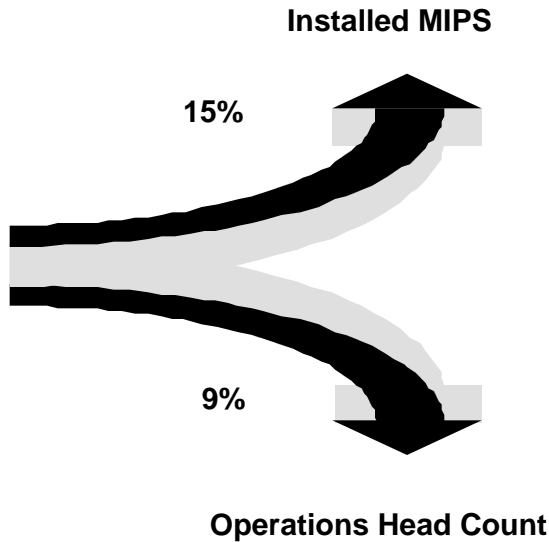
Source: Real Decisions, a Gartner Group company

Key Issue: Where is the mainframe data center headed?

Those data centers that grow with no increase in annual hardware expenses do see their software bills rise. Software cost per MIPS declines, but not as fast as that for hardware. Economies of scale play a big role here, with size and buying power having a decided advantage in keeping unit costs low.

Beyond scale, strategies that will drive down cost per MIPS in the coming years are related to the basic business posture of the data center as well as market knowledge and negotiation skills. Multiple operating platforms and subsystems drive up software costs, and data centers differ in their degree of influence over the complexity of their environment. A data center that can say “no” to little-used, costly software has a better chance to keep its software costs low. For example, one data center we work with reported that it would not support DB2 until MULC pricing was available. Beyond strategic questions of platform and subsystem support there is scope for managing the cost of the software portfolio. Top performers establish task forces to audit the product list, rooting out little-used products or those that duplicate others in function. They also find conversion costs worth paying to eliminate multiple versions supported.





Recent year-to-year data for 50 data centers

Source: Real Decisions, a Gartner Group company

Key Issue: Where is the mainframe data center headed?

Operations head count is directly related to the volume and composition of the data center workload. Print and tape work show particularly strong correlations with staffing levels. Data centers that focus on automating or replacing labor-intensive work can reduce head count.

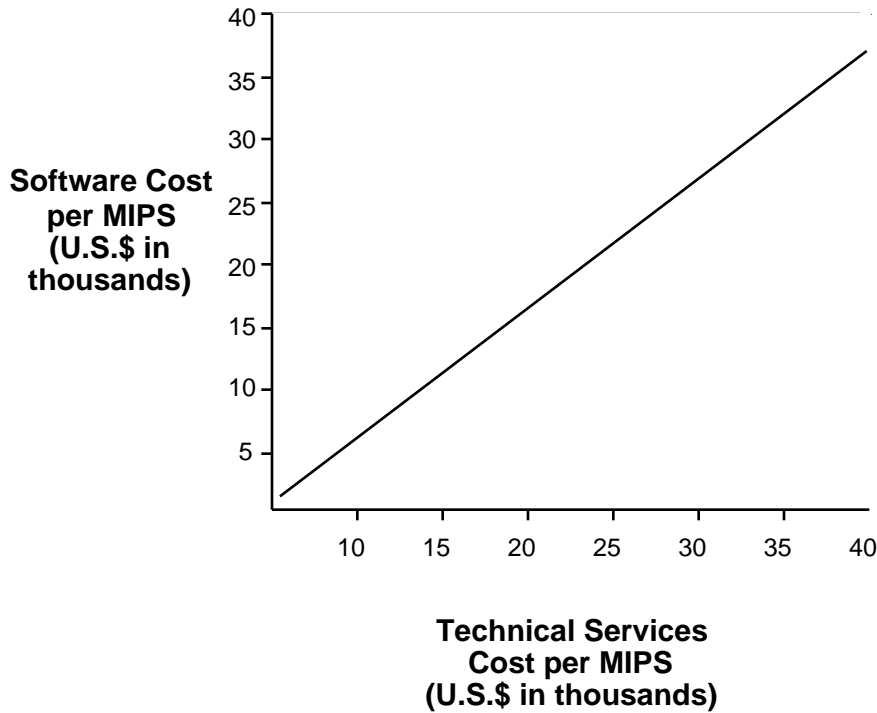
Online viewing options have aided in reducing the volume of print at many data centers. Communication, training and chargeback incentives are key factors in realizing this benefit. Some have also saved by outsourcing the COM function. Automated tape libraries are usually justified, at least in part, by head-count savings, and have been employed to achieve that end by many top-performing data centers.

Beyond these particular areas, most data centers have implemented at least some process automation. The key factor seems to be the integration of the various components to eliminate “wait time” and improve efficiency.



Technical services staffing is related to software.

Reader Notes



Source: Real Decisions, a Gartner Group company

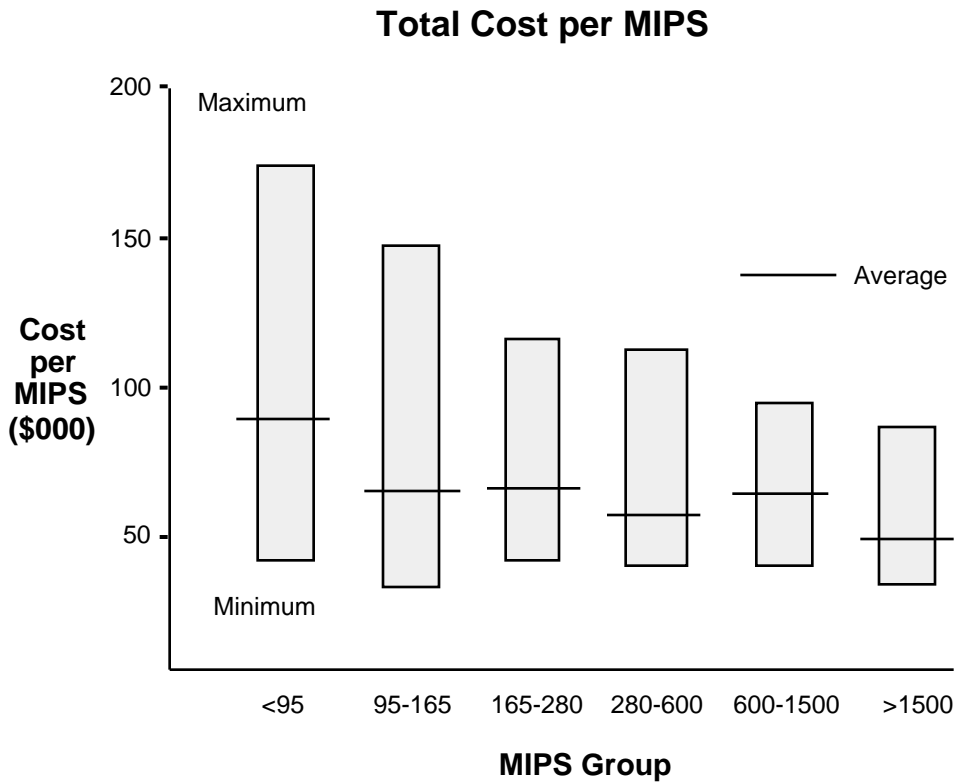
Key Issue: Where is the mainframe data center headed?

There is a well-established correlation between technical head count and software. The more complex the software environment (multiplicity of images, numbers of products and platforms), the more support personnel are required. Portfolio audits that result in fewer products can save money in personnel as well as licenses.

Organizations that depend on senior personnel and devote the training resources necessary to keep their skills at the “cutting edge” will also fare well. This approach pays off in reduced staffing levels as well as in a high-quality organization.

Economies of scale are particularly evident in technical services. Even data center organizations that maintain multiple physical sites (for disaster recovery or other reasons) will manage them with one technical support group.





Source: Real Decisions, a Gartner Group company

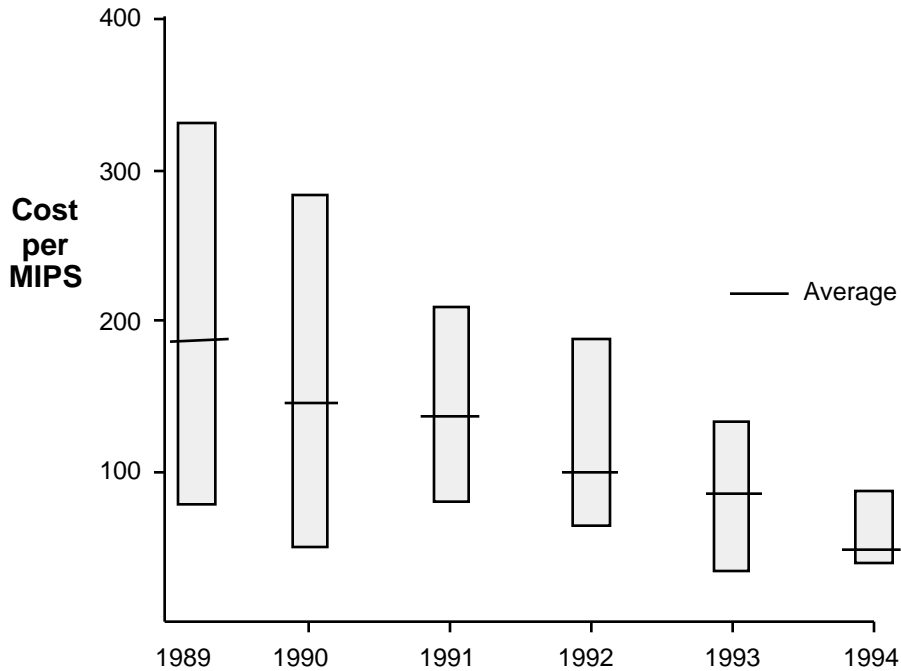
Key Issue: Where is the mainframe data center headed?

For overall savings, many companies have consolidated several mainframe data centers into one or two. As seen in our database, a broad range of savings is possible. The chart shows total cost per installed MIPS declining with size, as least until the highest ranges. Software, staffing and occupancy are all areas where consolidation, if done skillfully, can result in fewer total MIPS installed, as workloads are combined, thus lowering total costs.

Our database shows marked economies of scale, at least up to about 500 MIPS. Beyond that point, it is the giants (1500 MIPS and above) who perform best; they are in a class by themselves in terms of the efficiencies they can achieve. While savings from consolidation are far from automatic in the 500 to 1500 MIPS range, the potential is still there. Those performing at an average or worse level of efficiency should certainly look at opportunities for consolidation; there is room for improvement for them within the performance boundaries illustrated here, although those boundaries narrow relentlessly every year.



The distance between best and worst performers is less than 20 percent of what it was five years ago. The scope for cost savings as a competitive advantage in the mainframe data center continues to shrink.



Source: Real Decisions, a Gartner Group company

Key Issue: Where is the mainframe data center headed?

Data centers that consolidate should move as rapidly as possible to consolidate software licenses, whether across multiple physical sites or within one. Software shows economies of scale throughout the range of our database, so capitalize on this cost-saving opportunity. If more than one physical site remains, centralize staff as much as possible in one location, running others on a “lights out” basis.

Ensure that two or more physical sites are similar enough in configuration to provide contingency capabilities. If consolidation leaves only one site remaining, be sure that adequate commercial coverage exists, with a well-defined, rigorously tested plan in place.

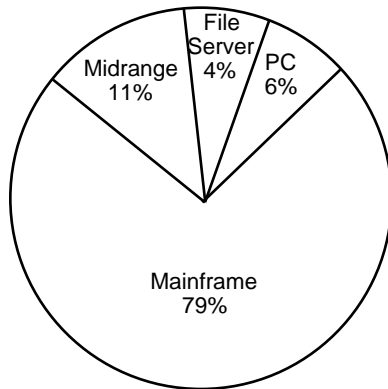
Our research has shown that data centers that specialize in one type of processing or another tend to be the most efficient. A consolidated data center should attain a size that makes it practical to segregate workload types (batch, online) on different platforms, allowing each to be tuned to address its particular specialty.



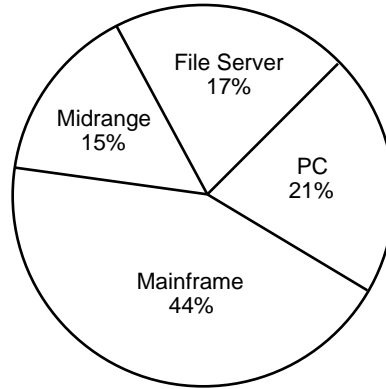
Development trend shows movement to client/server.

Reader Notes

Applications Development and Support by Platform



Current Production Systems



Development

Reasons for Adopting Client/Server:

1. Improved customer satisfaction, responsiveness and service quality
2. More-flexible business processes that are easily modified and more responsive to change
3. Reduced business expense
4. Increased end-user productivity

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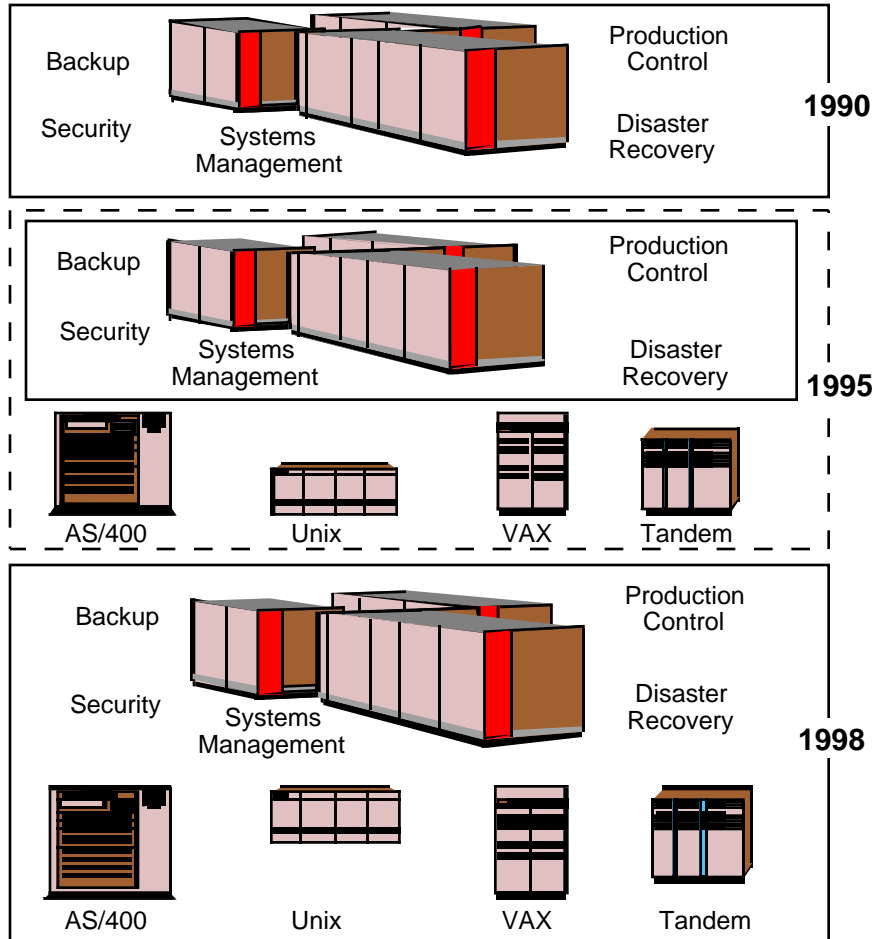
The value delivered by the mainframe will rise, then, but what will be its role? It will be a component in a heterogeneous mix of processing platforms. The above charts break down production system support and new development work being done by Real Decisions clients according to computing platform. We can see the client/server wave crashing over the mainframe data center. The mainframe may be pulled along in the wake; distributed applications with links to mainframe databases often make users more productive, increasing their volume of DB2 calls per hour, but numbers such as these seem certain to shrink the rates of mainframe MIPS growth that we have seen in recent years.

Gartner clients give many reasons for choosing the client/server route. The most popular ones are listed above. PCs are everywhere and tomorrow's applications will use them; the only questions are how all this distributed functionality will be managed and, most relevant to our discussion, what it will all mean for the data center.



By 1998, 50 percent of corporate data centers will offer integrated support of non-mainframe platforms (0.8 probability).

Reader Notes



Source: Real Decisions, a Gartner Group company

Key Issue: What will the success of new computing platforms mean to the data center?

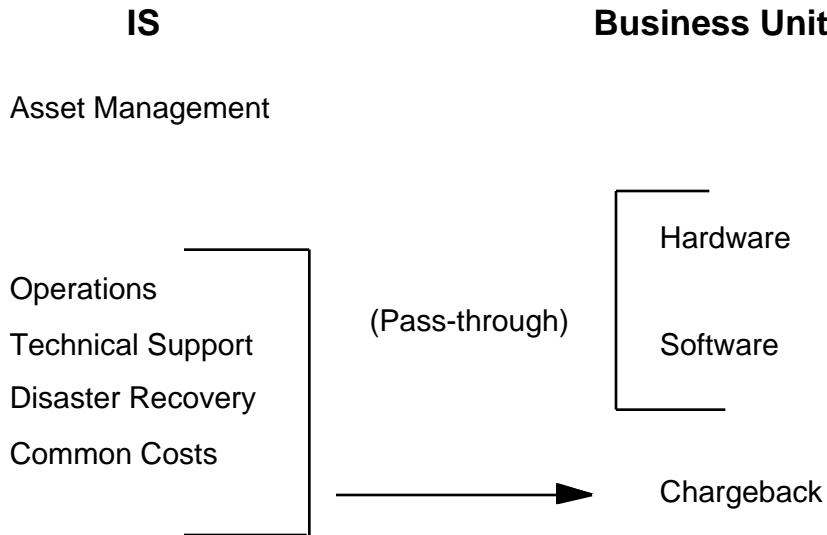
For several years, islands of computing power have been springing up throughout the corporation. Driven by the factors listed above, departments and BUs have installed their own alternatives to the mainframe: VAX, AS/400, Tandem and other midrange or server platforms. They have brought freedom and independence from an often oppressive-seeming central IS organization, but not without a downside. Security, production control, disaster recovery, systems management and other tasks of the traditional data center now fell to the unit's own staff.

In reaction, we have seen something of a counter-trend in recent years. Business units have increasingly turned to the data center organization to manage their dedicated systems. All sorts of hardware has turned up on the raised floor, the mainframe, to be supported by the same staff. Data centers are having to cope with this multiplicity and learn how to apply and communicate their skills in this new, heterogeneous environment.



A business model for supporting a diversified midrange data center.

Reader Notes

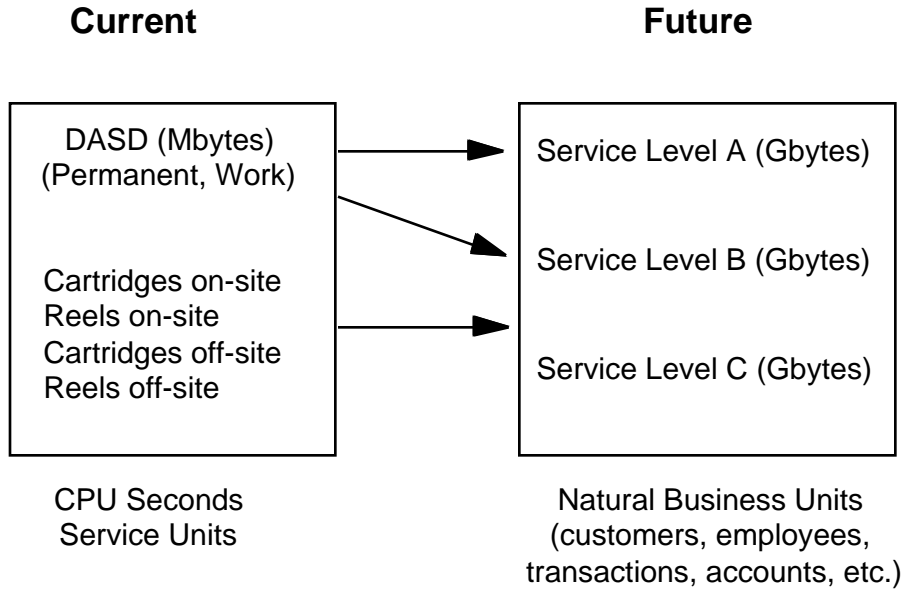


Source: Real Decisions, a Gartner Group company

Key Issue: What will the success of new computing platforms mean to the data center?

One large corporation with which Real Decisions has worked is supporting a midrange environment that embraces practically every platform on the market. Growth by acquisition and a history of BU independence are the factors that led to this position. Support has been centralized, however, and single operations and technical staffs support the majority of midrange activity at the company. The data center organization has recognized what it feels to be the key drivers in determining its support effort and has reflected them in its chargeback policies. A data-center customer is charged for support based on such characteristics as the criticality of its system to the business, number of different types of network interfaces and whether the operating system is proprietary or Unix (the company's preferred environment for the future, hence, charged less for support). Costs for the console system, which has automated up to 85 percent of all midrange operations activities, are allocated across platforms along with other common costs such as occupancy. Such a system forces careful tracking of resources and activities, builds knowledge about the true costs of the many different systems in use and offers incentives to encourage standardization and effective use of resources.





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Key Issue: What will the success of new computing platforms mean to the data center?

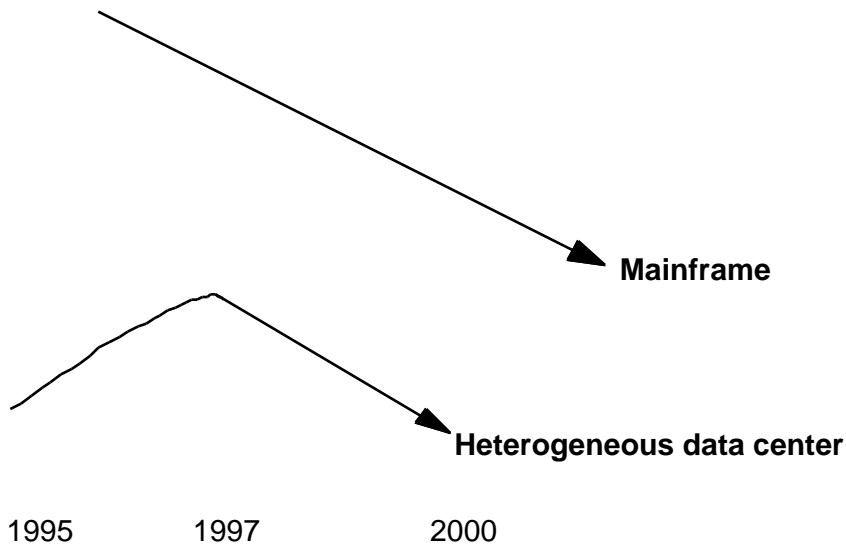
Just as in the midrange case, client/server solutions will require the skills to be found in the data center, especially as they address more and more mission-critical tasks. The data center organization of the future will be heterogeneous, supporting a mix of platforms. It may even be composed of smaller IS groups, aligned with business units, for better response to business issues. As new applications mature, scale up and/or become mission-critical, they will still tend to migrate to a central data center, for its characteristic reliability, efficiency and security.

The metrics used in benchmarking the data center will change as well. Cost per natural BU processed makes more sense in this new alignment than cost per MIPS or CPU second; the claims-processing function wants to know its cost per claim, Human Resources its cost per employee, and so on. Data is the key corporate resource managed by IT, even as processing is dispersed through the corporation, and data management is the key justification for a centralized IS function. Network-attached storage and shared DASD will make data more broadly accessible and increase the importance of managing it well. Whatever the storage medium or computing platform, cost per GB linked to levels of accessibility (online, nearline, offline) will be a critical measure for judging the efficiency and effectiveness of the data center.



The average unit cost to support a heterogeneous data center will rise through 1997, then start to decline (0.7 probability).

Reader Notes



Note: The arrows indicate direction of mainframe and heterogeneous costs, not the relation between them.

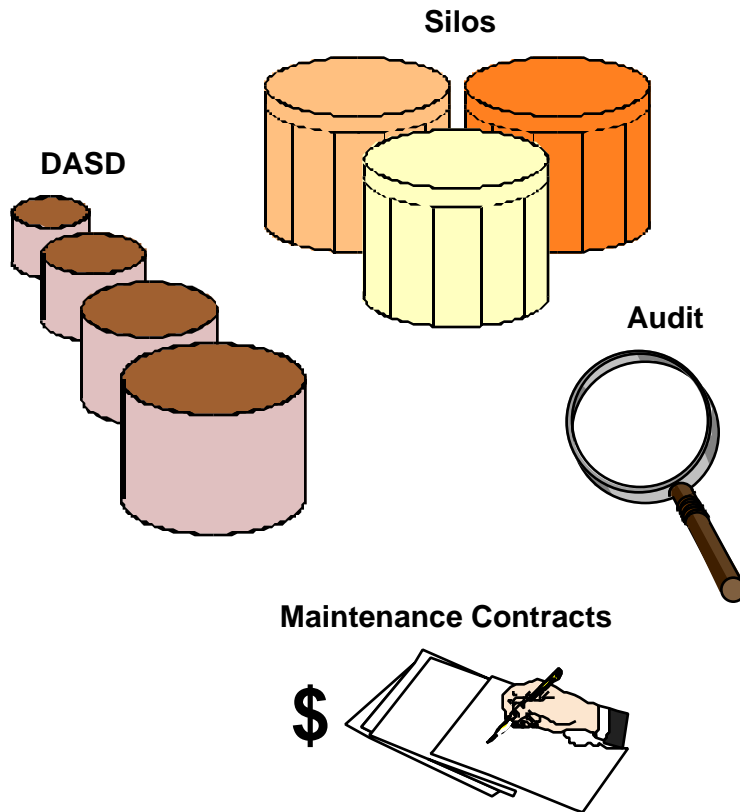
Source: Real Decisions, a Gartner Group company

Key Issue: What should data centers be doing now to survive and flourish in the future?

Strategies like consolidation address the issue of delivering mainframe resources as efficiently as possible. Some IS organizations have been thinking more broadly about how best to serve their parent entity and ensure that they are making a real contribution to effectiveness and competitive positioning. One particularly well-conceived and well-executed plan is worth examining in some detail. Its goals were to lower the cost of computing, assist in the migration toward more cost-effective platforms and develop a true client/server infrastructure.

An immediate goal was to avoid upgrading the mainframe, which meant cutting down on prime shift capacity utilization. A weekly "top 20" list was instituted, which identifies the "top 10" batch and top 10 TSO users according to CPU utilization. Users are contacted and discussions held about moving some processing to an off-prime shift and/or arranging technical help to make jobs run more efficiently. Internal applications were targeted as well. Unnecessary reporting tools were eliminated, saving on both CPU and storage. The net result has been a 5-percent decrease in prime-shift utilization and the downward trend is still in evidence.





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In the storage management arena, negotiations to replace some older disk space with IBM's Rmac technology yielded considerable cost savings. Eliminating unnecessary and redundant backups eased a space crunch in the tape silos. After six months of this effort, the number of unused tapes in the silos had been cut almost in half. These tactics bought time to formulate a longer-term tape strategy.

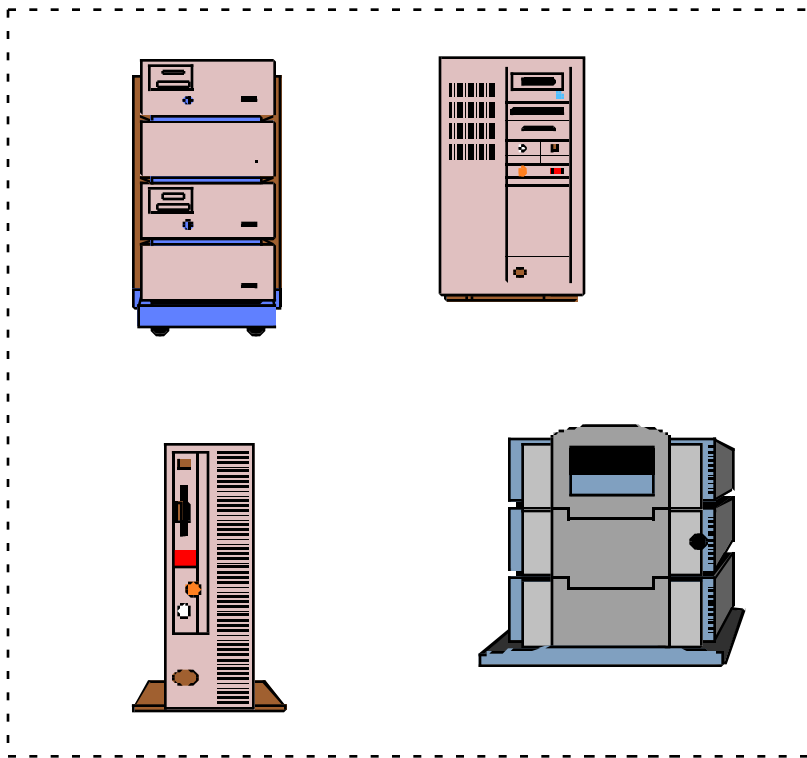
Hardware maintenance contracts were renegotiated, yielding 45-percent savings on existing agreements with both Digital and IBM. Service levels were downgraded on specific devices as well. Once the service contracts near expiration, third-party maintenance alternatives will be explored. As with many data centers, software licenses offered opportunities for savings. Over 15 unnecessary products were identified and eliminated.

An outside vendor has been selected to do a performance audit on the mainframe and suggest operational improvements and performance enhancements. A hardware vendor will review the software installed on the mainframe and identify any further possible product eliminations. Their fee will include 35 percent of any license-fee savings realized.



Robust, full-service, dependable multiserver data center.

Reader Notes



Operations
Disaster Recovery

Technical Services
Security

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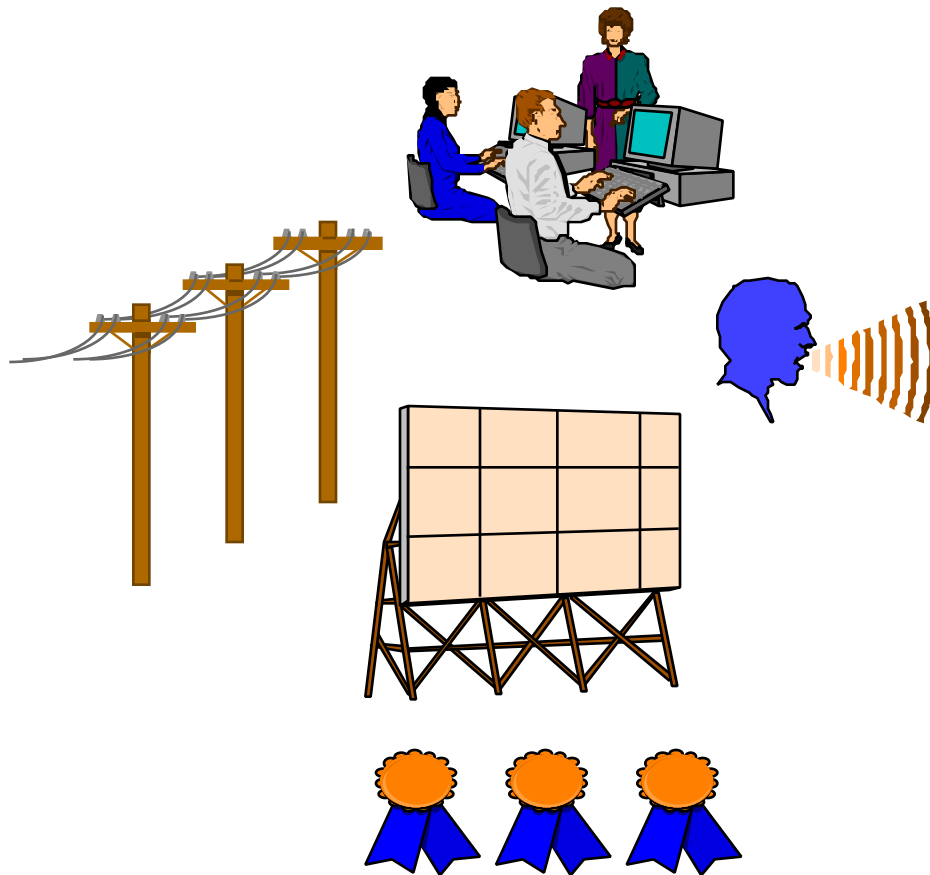
Looking ahead, the data center will continue its progress toward a “lights-out” operation. Scheduling, IPLs, backups and problem notification are areas of focus for automation efforts. Automating tape backups will also help. Major reductions in footprint for tape and DASD will “free up” space in the data center for new platforms, another instance of a data center becoming home for non-mainframe technologies.

Taking a more strategic view, the data center worked with the applications support area to help compile a catalog of applications supported, with information about their CPU and storage utilization and their interrelationships. This catalog will be a useful tool in determining migration strategies. The implementation of a client/server-based financial package led to the development of a production-server environment. The server will be supported 24 hours a day, with security, redundancy and data backup. A disaster-recovery strategy has been developed as well. This whole effort will serve as a prototype in implementing a true client/server infrastructure.



Communication is a key element of the transition.

Reader Notes



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Key Issue: What should data centers be doing now to survive and flourish in the future?

An aggressive training effort is under way to give data center staff the skills they need in the new world; Unix, networking and Microsoft NT classes have been held so far. Publicity, awards and slogans have all played a part in fostering the team spirit needed for the venture into uncharted territory that is migration. Re-engineering is a priority for the entire corporation, and the fact that IT is leading the way is important to its sense of mission.

This company's story shows a strategy that looks ahead to a new paradigm, re-examining accepted practices, while making the existing environment as efficient and effective as possible. The skill base built up over the years in the mainframe world will be enhanced and the traditional virtues upheld in the new environment. The data center organization will survive and flourish because it has adapted to, and indeed helped fashion, this historical shift.



- The cost per unit of work for mainframe data centers will continue to fall.
- There are many strategies data centers can take to accelerate the cost curve, although the difference between best and worst continues to narrow.
- Current development activity shows that tomorrow's data center will be a heterogeneous mix of platforms.
- The data center organization will need to apply its traditional skills in managing this new environment.
- The evolving benchmark for data center success will measure how well the organization responds to this "call to arms": how well it leads the way into this new world of productivity and value.

