



**CORPORATE IT BUYING BEHAVIOR &
CUSTOMER SATISFACTION STUDY:
INTEL-BASED SERVERS**

FIRST QUARTER 2004

CONDUCTED BY TECHNOLOGY BUSINESS RESEARCH, INC.

PUBLISHED: MAY 4, 2004



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Table of Contents

INTEL-BASED SERVER CUSTOMER SATISFACTION..... 3

NOTICE TO OUR READERS.....3

EXECUTIVE SUMMARY.....3

 WHERE WE LEFT OFF..... 3

 THE SCORE..... 3

 THE MAIN EVENTS..... 5

 COMPETITIVE STRENGTHS AND WEAKNESSES..... 9

 FUTURE OUTLOOK..... 10

 BEHIND THE NUMBERS..... 12

1Q04 ANALYSIS.....15

 TRACKING THE SATISFACTION INDICES..... 15

 VENDOR DIFFERENTIATION AS DEFINED BY ABILITIES TO MEET CUSTOMER EXPECTATIONS..... 16

 TRENDS OF THE REPORTING PERIOD..... 21

 NEEDED IMPROVEMENTS..... 22

 THE LOYALTY FACTOR..... 24

APPENDIX A: ANALYTICAL GRAPHS AND TABLES30

 INTEL-BASED SERVER PURCHASING CRITERIA..... 30

 DETAILED SATISFACTION RATINGS AND SCORING COMPARISONS 31

 QUARTER-TO-QUARTER TRENDS ANALYSES..... 37

 COMPETITIVE GAP ANALYSES..... 41

 SATISFACTION-TO-IMPORTANCE TRENDS ANALYSES 43

 ADDITIONAL INTEL-BASED SERVER ISSUES 45

APPENDIX B: STUDY BACKGROUND46

 1Q04 SAMPLE OVERVIEW.....46

 ON PERCEPTION AS THE KEY TO CUSTOMER SATISFACTION.....46

 CUSTOMER SATISFACTION STUDY DESIGN47

 METHODOLOGY AND SAMPLE47

APPENDIX C: CUSTOMER SATISFACTION RATINGS: PROCEDURAL DESCRIPTION.....51

 ANALYTICAL MODEL.....51

APPENDIX D: SURVEY INSTRUMENT54

 CBQ SUPPORTING CUSTOMER SATISFACTION SURVEY (1Q04).....54

APPENDIX E: INTEL-BASED SERVER CUSTOMER SATISFACTION SCORES: 1Q02 THROUGH 1Q0460

APPENDIX F: STUDY DESIGN CHANGES 62

 SCORING METRICS.....62

 CHANGES IN ATTRIBUTE COVERAGE62

 ADDITIONAL SURVEY INSTRUMENT CHANGES.....62

INTEL-BASED SERVER CUSTOMER SATISFACTION

NOTICE TO OUR READERS

The 1Q04 customer satisfaction studies represent a shift in strategy that TBR is confident provides a more representative profile of customer satisfaction based on recent changes within the marketplace, the players, and most importantly, the brand decision makers. The basic methodology has remained unchanged and the new design will not significantly affect the tracking of the satisfaction indices. For details on the specific design changes, please see “Appendix F” at the conclusion of this report.

EXECUTIVE SUMMARY

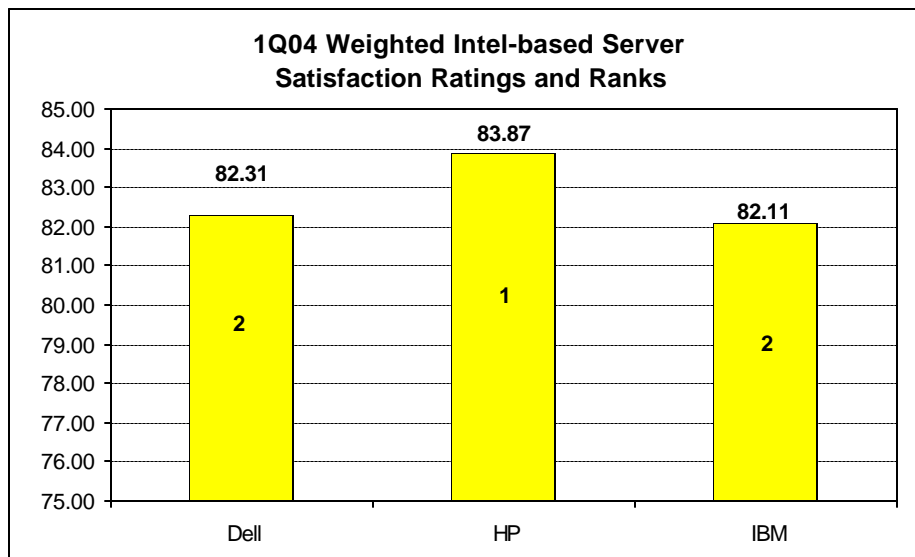
Where We Left Off

The narrowing distance between Dell’s and Hewlett-Packard’s weighted satisfaction indices became tighter still in 4Q03, representing the third consecutive quarter in which the two vendors shared the No. 1 ranking position. Dell maintained its pricing/value and ease of doing business competitive advantages over HP, while HP performed significantly better than Dell with regards to server management tool satisfaction and customer loyalty. Dell’s delivery time competitive advantage was beginning to weaken, and TBR issued a competitive warning for server management tools. HP and Dell were perceived essentially as equal across the areas of replacement parts availability, hardware quality and phone support. Meanwhile, IBM was beginning to make some subtle progress; TBR observed fewer areas where HP or Dell had performed significantly better than IBM. It was deemed notable that IBM had rebounded entirely from its once chronic weakness regarding replacement parts availability. Yet, IBM continued to underperform both Dell and HP for delivery time, ease of doing business and overall satisfaction. IBM’s ratings were substantially below Dell’s for value and below HP’s for both server management features satisfaction and customer loyalty. While IBM had typically underperformed HP for overall value by a significant margin, in 4Q03 our statistical tools were unable to prove this was still the case. Thus, the two vendors appeared approximately on par with one another regarding customer perceptions of their server value.

In the “Future Outlook” section of TBR’s *4Q03 Corporate IT Buying Behavior & Customer Satisfaction Study: Intel-based Servers* report, we noted Dell’s server management tool satisfaction levels were declining and HP’s hardware quality and on-site support ratings were on the rise. While we were beginning to see HP’s satisfaction index moving ahead of Dell’s, the two were still deadlocked due to TBR’s rules where the distance between any two vendor’s weighted satisfaction indices must lie at a minimum of 1% in order for the two to occupy separate ranking positions. We were observing Dell’s scores continuing to decline while HP’s and IBM’s were either stable or slightly improving. In hindsight, we were observing the beginning of a new trend.

The Score

Based on their weighted satisfaction indices, the new ranking lineup of the Intel-based server vendors shows the new No. 1 ranked vendor HP flanked on both sides by Dell and IBM sharing the No. 2 spot. Nevertheless, this represents a narrow spread across the satisfaction indices, just 2% total in a market sector where separations of 5% or more had been the norm. Due to the 2.2% magnitude drop in Dell’s satisfaction index between 4Q03 and 1Q04, the previously tight distance between Dell’s and HP’s indices (sharing a No. 1 ranking position) has been increased and reversed. Consequently, HP’s index has moved ahead of Dell’s by a comfortable margin of 1.9%. HP takes sole ownership of the No. 1 ranking position while Dell drops to No. 2, a position it has not held since 1Q01. Meanwhile, the steadily rising status of IBM’s satisfaction index has resulted in an eradication of the historical distance separating its index from its competitors’ to a mere 0.25% between IBM’s and Dell’s indices. The result is a shared No. 2 ranking position for Dell and IBM, which is a unique placement of the principal players in this competition. While the past has shown us incidences where HP has overtaken Dell in the competition (1Q02) and where we have seen IBM’s index meet up with HP’s (2Q02 and 3Q02), the current pattern has never been observed in the history of this study. These are truly interesting times, as customers do perceive specific differences across the brands, and yet in the end, perceive fewer overall differences across the brands (overall satisfaction: Dell, 5.91; HP, 5.99; and IBM, 5.80). Customers do perceive differences across specific attribute areas – Dell is perceived as best for value, HP as best for server manageability and IBM appears to perform best for sales rep relationship with customer. (Note: Data was only collected for three months for the sales rep relationship with customer attribute, as it was added in January 2004.) However, in the end we see a relative tightness of the competition, as we had previously observed when TBR covered the highly competitive UNIX server marketplace.

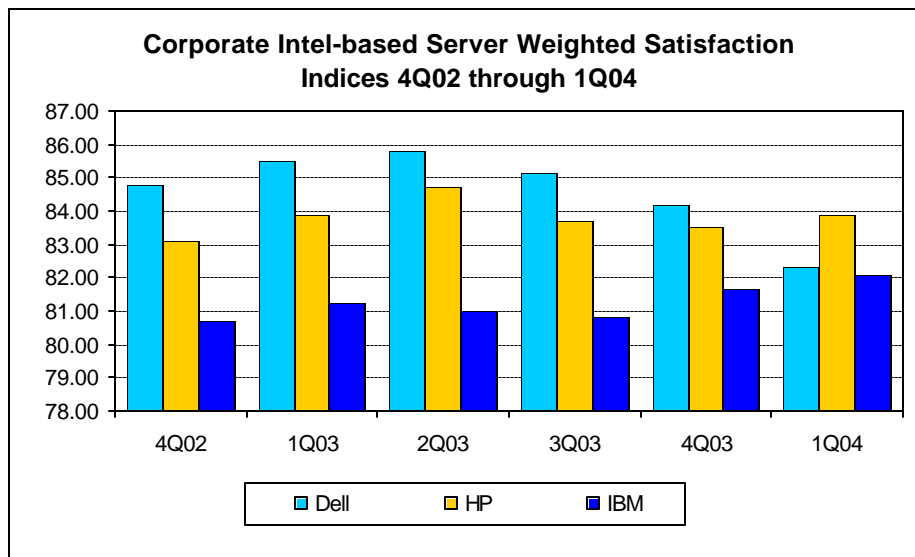


HP's win this quarter was based largely on its server management tool competitive advantage, surprising in that this attribute tends to take a back seat to more critical considerations when customers are asked to state their priorities. Yet, because the differences were so large, it was a major contributor to HP's winning position this quarter. Other areas contributing to HP's positional advantage this quarter are areas of possible vulnerability – areas where ratings can fluctuate or where the advantage was not confirmed: hardware quality and loyalty. On the other hand, server manageability is an area where HP consistently wins.

In understanding which attribute deficits had the most adverse effect on Dell's weighted score, server management features, again while of low stated importance, contributed most significantly. Secondary areas where Dell could benefit from moderately improved scores include configuration consistency, relationship with sales rep, on-site support and loyalty. Note, however, Dell was benefited considerably by its strong and consistent value advantage. Dell benefited over HP for value nearly as much as HP benefited over Dell for server manageability. Both relationship with sales rep and server management feature satisfaction opinions were diverse among Dell customers, suggesting some customers are experiencing issues while others are clearly not. Yet, both areas will likely need to be addressed.

IBM was penalized most significantly by its delivery time rating, with secondary factors including server management tool satisfaction and loyalty, and of course value when related to Dell's position in the study.

In considering the relative positions of the Intel-based vendors' scores throughout the past six-quarter timeframe, we note the reduction in the size of Dell's leadership position in 4Q03 was a precursor for the position of its index in 1Q04: it has subsequently fallen behind HP's. We observed this condition last in 1Q01, after which Dell's ratings set into a rebounding pattern where the vendor re-established its No. 1 ranking position over HP from 3Q01 through to 3Q03. While HP's ratings declined alongside Dell's between 2Q03 and 3Q03, the difference is that HP's scores have stopped declining and have exhibited a far greater level of stability than have Dell's. Meanwhile, IBM has been the vendor to watch, as its satisfaction index rating, once as much as 5% from the position of Dell's, has closed the gaps to the point that a mere 0.25% separates IBM's index from Dell's.



The Main Events

In the preceding quarter, TBR continued to look for evidence of marketplace certainty, something that would tell us whether either Dell or HP, whose satisfaction indices were repeatedly locked in a competitive stalemate, could move to the front of the line. In the *4Q03 Corporate IT Buying Behavior & Customer Satisfaction Study: Intel-based Servers* report, TBR pondered: “The matter remains frustratingly vague as to which vendor, Dell or HP, offers the best overall choice. This is because the solutions appeal to two very different sets of customer, and it appears this is the way things will remain unless a fatal flaw is discovered in either vendors’ strategy.” We are not observing a fatal flaw and perhaps we were asking ourselves the wrong question in that the marketplace may be too big, too complex for one vendor to have all the answers. While something has finally happened to prove the deadlock has disentangled (in that HP has moved to a sole No. 1 ranking positive above Dell), we cannot be fully certain that this is the beginning of a domination over the market sector by one vendor (in this case HP) because thus far the shift represents a single quarter. However, if the trend continues through another quarter, we may need to restate our position. But at this point, we fully believe any vendor has the ability to take a leadership position in the sector.

TBR continues to believe this marketplace allows room for different choices based on different vendor strategies. The case can be made that the competition has tightened overall, primarily because the longstanding trailer in this study, IBM, has taken advantage of the opportunity to move up in the rankings. Consequently, Dell and IBM now share the No. 2 ranking position. It is also clear that customer satisfaction runs relatively close across all three major players in some key areas (of particular interest is the overall satisfaction rating, the rating that sums up the customer satisfaction experience). Additional areas where considerable differences in customer perception existed in the past have become muted, including such key indicators as ease of doing business, replacement parts availability and phone support.

The most obvious “big story” this quarter involves the move on the part of HP. As indicated in “The Score” section above, HP has risen to the No. 1 ranking position, unshared, based on the fact that a number of enabling factors have converged. In part, it is the continuing declines we have been observing with regards to Dell customer satisfaction that have presented the opportunity for HP. Note Dell’s current satisfaction index measured 4% lower than the all-time high it hit in 2Q03. Comparatively, HP’s current index has eroded by just 1% from its all-time high, also achieved in 2Q03. Dell’s ratings have declined most dramatically with regards to satisfaction with server management features (down 5% from 4Q03 to 1Q04), along with some additional declines with regards to ease of doing business (–2%) and overall satisfaction (–2%). In contrast, none of HP’s ratings declined this quarter over the preceding quarter. TBR believes the continuing declines evident in Dell’s ratings have largely created the opportunity not only for HP to advance in the study, but also IBM. Note HP’s and IBM’s ratings have moved up only gradually over time. Their relative successes have been largely dependent on the downward trends occurring within the Dell ratings. This is not to discredit IBM’s remarkable progress; 1Q04 represents a new all-time high, while Dell and HP have dropped from their respective apex positions.

The second factor allowing HP to move ahead in the rankings is to HP's credit. It has become an expected finding in these studies that HP would do well with regards to the software side of the equation; HP has consistently performed exceptionally with regards to server management features. The divide between HP's lofty satisfaction ratings and those of the competition has deepened considerably this quarter. And while this attribute continues to come in at the lower end of the order when customers are asked to state their priorities (and particularly low on the list of priorities among Dell customers), at the end of the day server management exerts a powerful influence on the way customers feel overall about their vendor. In this quarter's study, server management tool satisfaction correlated strongly with overall satisfaction across all three customer groups. With the increasing demand for simplified solutions and more recently for server consolidation, TBR believes software tools for server management will become increasingly relevant in this marketplace.

The fact that HP has moved alone to the front of the pack this quarter for the first time in three years represents the single most notable event this quarter. Yet, TBR must caution the continued domination of HP is highly contingent upon a number of factors as there are several destabilizing influences in the marketplace. HP will need to retain its strong customer loyalty rating, which is presently at an extremely high level. HP will also need to retain, at a minimum, all or some of its marginal competitive advantages, including on-site support, model configuration consistency and hardware quality/reliability. HP's position will also be dependent on Dell not making a major comeback. For example, if Dell's value competitive advantage were to rebound to the levels we used to see (the gap between Dell's and HP's overall value ratings has dropped to 5% in 1Q04, down from previous highs of nearly 10%), that might make a considerable difference in the satisfaction indices. At present, however, (see the "Future Outlook" section), it does not appear Dell's ratings are ready for a comeback.

Below is a one-on-one comparison of HP's and Dell's scores in the preceding and current quarters. Dell has maintained its hold on the positive perception of its customers regarding overall value, but ease of doing business has fallen away from being a brand differentiator for Dell. HP continues to score significantly above Dell with regards to server management features, while a few areas have been added where HP scored moderately above Dell, including hardware quality, on-site support and model configuration consistency. In order to determine the essential reason for HP's win this quarter, consider the differences cited below. The size of Dell's lead over HP for overall value was not as great as HP's lead over Dell for server management features, and even when we factor in the importance weights (overall value being of considerably higher stated importance than server manageability), HP still has a slight edge. The additional areas where HP has moderately outperformed Dell were enough to ultimately push HP to the forefront.

As far as Dell is concerned, TBR believes these findings are not realistically the sign of a vendor in decline, but rather of shifting customer expectations and the criticality with which customers perceive Dell. This is a combination of influxes of new customers with high expectations for their new vendor and the perception that Dell should be performing better based on their well-known market share gains. These new customers are also aware of Dell's reputation for strong customer satisfaction.

Dell vs. HP Scoring Analysis – 1Q04 vs. 4Q03

Dell vs. HP Analysis	4Q03	1Q04
Dell significantly outperformed HP	Overall Value	Overall Value
	Ease of Doing Business	
HP significantly outperformed Dell	Server Management Features	Server Management Features
	Customer Loyalty	
		Hardware Quality/Reliability
		On-site Support
		Configuration Consistency*

Note: Categories in **bold** confirmed by adjusted t-test (bonferroni correction).

* Attribute added in 1Q04; not applicable in 4Q03.

IBM's satisfaction index reached its highest point in 1Q04. Between 4Q03 and 1Q04, none of IBM's satisfaction ratings declined by more than 1%, and most remained relatively static. The rate of change within IBM's weighted satisfaction indices has been measured, and we now find ourselves at a point where IBM is becoming a true contender based on this relatively slow-paced level of improvement. It is easy to see from the table below how IBM has been able to improve its positioning without improving dramatically; IBM has simply remained stable amidst a

drifting current. While Dell significantly outperformed IBM in a total of four categories at the most reliable level of confidence in 4Q03 (and an additional area where Dell moderately outperformed IBM), that number has been reduced to two categories in 1Q04: delivery time and overall value. Against HP, the five categories where HP significantly outperformed IBM in 4Q03 (plus an additional area where HP moderately outperformed IBM) have been reduced to just two. It appears IBM remains challenged primarily in the historically weak areas of value perception against Dell, server manageability against HP and delivery time against both vendors. It is also impressive that IBM has performed significantly better than its competitors with regards to the new attribute, relationship with sales rep. This has become an interesting new dynamic that lends IBM considerable credibility.

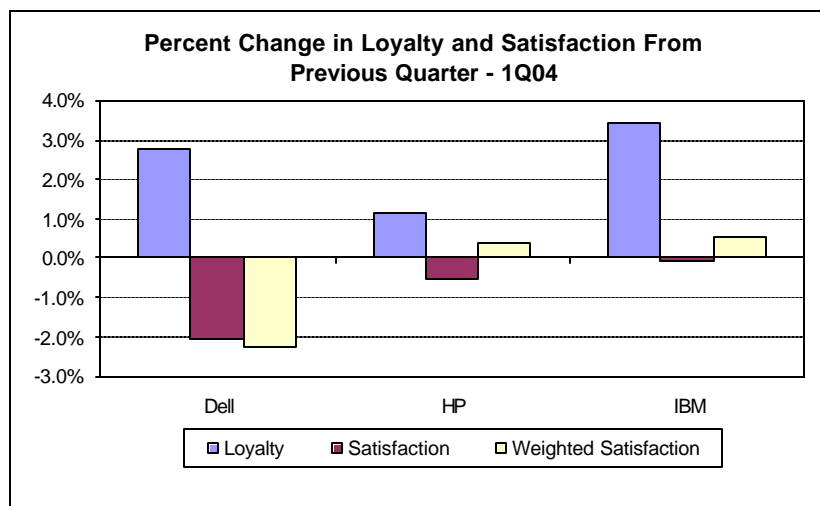
IBM vs. Competition Scoring Analysis – 1Q04 vs. 4Q03

IBM Analysis	4Q03	1Q04
IBM significantly outperformed by Dell*	Delivery Time	Delivery Time
	Replacement Parts Availability	
	Ease of Doing Business	
	Overall Satisfaction	
	Overall Value	Overall Value
IBM significantly outperformed by HP	Delivery Time	Delivery Time
	Server Management Features	Server Management Features
	Ease of Doing Business	
	Overall Satisfaction	Overall Satisfaction
	Customer Loyalty	
	Hardware Quality/Reliability	Hardware Quality/Reliability

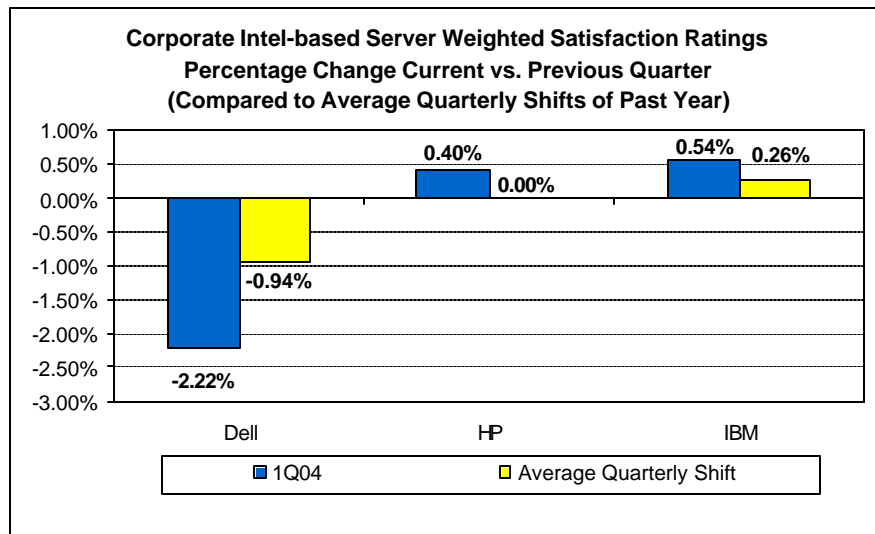
Categories in **bold** confirmed by adjusted t-test (bonferroni correction).

* IBM significantly outperformed Dell for the added attribute of relationship with sales rep in 1Q04.

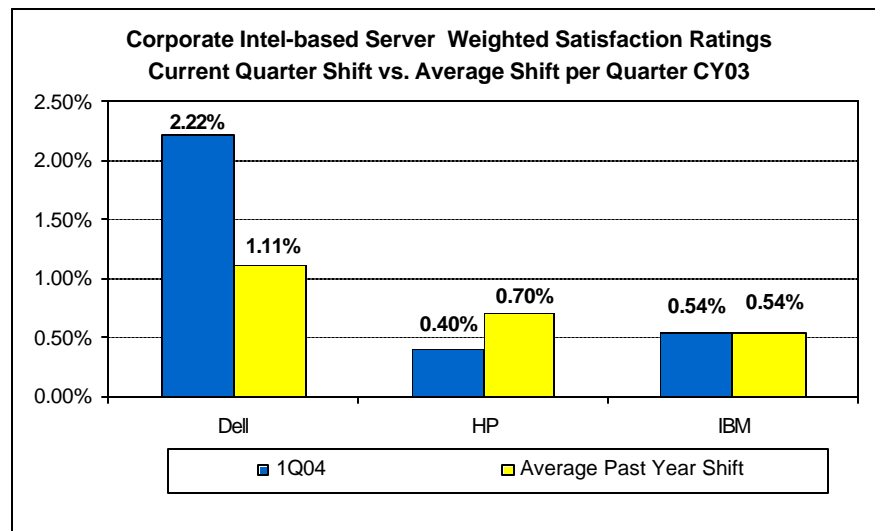
The graph below presents the percentage change in the vendors' customer loyalty ratings, overall satisfaction and weighted satisfaction indices between 3Q03 and 4Q03. Although customer loyalty was largely at the root of Dell's declining satisfaction index in 4Q03 from 3Q03, the situation now has reversed itself. The rebound has actually occurred within the stated loyalty levels of Dell customers, while customer satisfaction has predominantly been the source of 1Q04 declines. Again, this phenomenon points to the likely divisions of opinion among customers regarding the Dell strategy and the constant influx of new customers with varying expectations. HP's loyalty ratings have moved up again, though only modestly compared to the increases we are observing within Dell's and IBM's loyalty ratings. Overall, little has changed relative to HP's positioning. Note the substantial rise in IBM's position has almost exclusively been the result of increasing loyalty. It will be critical to observe how this condition evolves in the next several quarters; the potentially anomalous rise in IBM customer loyalty may or may not be backed up by strong enough satisfaction as we move forward.



During the past four quarters, both HP's and IBM's weighted satisfaction indices have been quite stable while the pattern formed by Dell's indices shows a net loss of nearly 1 percentage point. Although this proportion remains within the "moderate" level of change, the difference between the trend line for Dell versus HP and IBM is considerable. The current quarter's activity, in which Dell's satisfaction index has dipped an additional 2.2%, represents an extension of the declining pattern. HP's current quarterly shift has been more positive than the average net movement of 0% for the past four quarters. IBM's ratings are the most improved of the three players; the current 0.5% rise in its satisfaction indices between 4Q03 and 1Q04 represents an upward movement twice that of the average net gain for the year. Yet, relatively speaking, the IBM satisfaction index movement has typically been modest at best.



In considering the magnitude of the satisfaction index shifts, regardless of direction, IBM's current movement is about average with the swing shifts of the past year, while the movement of HP's satisfaction index is considerably less than what we have typically observed in the past year. For Dell, the 2.2% change in its weighted satisfaction index between 4Q03 and 1Q04 represents twice the shift we have observed in the past year. The current downturn in Dell's index represents an acceleration of patterns established in the past year.



Competitive Strengths and Weaknesses

The following strength and weakness table is based on data compiled from several areas of the study: the t-test evaluations comparing each vendor to the sum of its competitors, the competitive GAP analysis (whereby each vendor's gap between satisfaction and importance is rationalized against the same gap for all respondents for each attribute tested) and the GAP analysis that measures each vendor's ability to meet the expectations of its customer base. Based on these three tests, a rating system was applied to each vendor for each attribute. An attribute must be cited as either positive or negative in two of three of these tests in order to be cited as a strength or weakness. In the event that a standard t-test was not confirmed by the ad hoc test (the more conservative t-test), a positive point was retracted.

Dell retains its overall value competitive strength and server manageability warning from the previous quarter. The vendor's delivery time strength had been reduced to a marginal strength in 4Q03. This quarter, due to the fact that both Dell and HP significantly outperformed IBM, Dell loses the competitive advantage entirely while IBM retains a competitive weakness for this historical area of challenge for the vendor. As the three vendors' satisfaction ratings for ease of doing business have now merged with the current quarter's data, Dell's prior competitive strength and IBM's competitive weakness have both been changed to neutral areas. Due to the elimination of competitive strengths for Dell in two areas, the vendor's numeric value score in the Strength and Weakness analysis has dropped from 4 points in 4Q03 to just 1 point in 1Q04. Overall satisfaction with Dell has been influenced most by perceptions of ease of doing business, hardware quality, delivery time and value on the plus side, while perceptions of Dell's server management tools have tended to have a more negative effect on the overall impression.

HP's 1Q04 performance matches Dell's in numerical value based on one competitive strength for server management features (also cited in 4Q03) and the softening of a prior competitive weakness to a warning for overall value. This decision was based primarily on the finding that HP's overall value satisfaction ratings were only marginally below average while IBM's were convincingly (at the more reliable level of confidence) below average. Additionally, the gap between satisfaction and expectation for IBM was one and one-half times wider than HP's. In the end, HP's numeric value score has increased from 0 points in 4Q03 to 1 point with the current quarter. HP customer satisfaction overall has been influenced largely by perceptions of ease of doing business, hardware quality, server management features, delivery time and support on the plus side and overall value on the negative side.

IBM's numeric value rating has improved considerably in one quarter's time, from -5 points in 4Q03 to just -2 points with the current quarter. IBM retains its competitive weaknesses for delivery time and overall value, but loses its prior competitive weakness for ease of doing business and its competitive warning for server management features. The former condition has been the result of an improvement in the satisfaction rating; in the latter, IBM's ratings were lower than those for HP, but not as far off the industry average as was Dell's. For the first time, IBM has gained a competitive strength, occurring relative to the newly introduced attribute relationship with sales rep. Here, IBM's satisfaction ratings ran significantly higher than Dell's while HP's did not. Overall satisfaction with the IBM brand has been influenced most considerably by perceptions of hardware quality, support and ease of doing business on the positive side, while satisfaction with value and server management features have tended to detract from overall impressions.

Intel-based Server Vendor Strengths and Weaknesses Summary

Vendor	Dell	HP	IBM
On-time, Reliable Delivery	○	○	⊙
Hardware Quality/Reliability	○	○	○
On-site Support	○	○	○
Phone Support	○	○	○
Replacement Parts Availability	○	○	○
Server Management Features	⊕	●	○
Overall Value	●	⊕	⊙
Overall Ease of Doing Business	○	○	○
Model Configuration Consistency	○	○	○
Relationship With Sales Rep	○	○	●
Numeric Value	1	1	-2

Key: ⊙ Weakness; ● Strength; ○ Neutral. ⊕ Warning area for weakness, but insufficient data to substantiate at this time. * The determination was marginal.

TBR's decision factors for the above citations include the following:

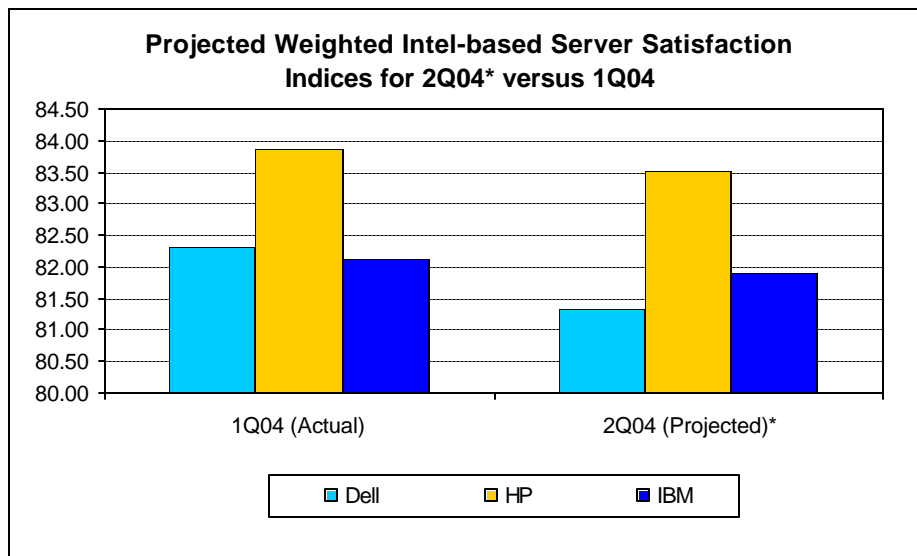
- IBM's server management feature rating was lower than HP's, but not as far off the mark as Dell's when compared to the group average. While HP scored extremely high in this attribute area, Dell actually met customer requirements as well as HP did due to lower expectations among Dell customers compared to high expectations of the HP group. Consequently, Dell receives a warning in lieu of a full competitive weakness, and IBM has been determined neutral.
- While HP's hardware quality rating was found to have run above the norm, it could not be confirmed by the most stringent t-test, and the gap between expectation and fulfillment was only marginally better than Dell's and IBM's (HP's gap measured -8% to Dell's -10% and IBM's -11%). Consequently, we could not attribute a competitive strength to HP for this attribute.
- With regards to overall value, HP's GAP rating was just outside the comfort zone at -6.5% compared to IBM's -9.5%. Consequently, HP receives a warning to IBM's full competitive weakness.
- Dell customer expectations have actually been narrowly exceeded with regards to relationship with sales rep, and consequently, Dell could not be cited with either a weakness or a warning for this attribute in spite of the finding that its ratings ran well below average. Dell's GAP rating of +4% (exceeding expectation), however, was not as positive as the scores of HP (+12%) or of IBM (+9%).

Future Outlook

Moving from the first to the second half of the 1Q04 reporting period (October through December 2003 versus January through March 2004.), we find a continuing degradation taking place within Dell's satisfaction ratings, a more modest decline within HP's, and continued consistency on the part of IBM. Dell's satisfaction ratings in the second half of the time period eroded most considerably across the areas of server manageability, ease of doing business and overall satisfaction. The conundrum posed by the condition of increasing loyalty alongside declining satisfaction appears to have become more complex in the second half of the reporting period. HP's satisfaction ratings show some modest declines across the board, with the only notable decline having occurred relative to server manageability, though the second-half mean score continues to soar above the scores of its competitors for the same time period. Of particular note is the accelerating increase in HP's customer loyalty rating, having risen from 4.08 in the first half of the reporting period to 4.30 in the second half, a substantial jump. IBM's satisfaction ratings between the two time periods appear to be basically static, while its loyalty rating rose moderately in the second half. Overall, the loyalty factor appears to be becoming more solid in defining customer endorsement of an "idea." In each vendor's case, there has been a strong commitment to and communication of a specific Intel-based server strategy as the marketplace evolves. Customers appear to be somewhat committed to the idea they have endorsed,

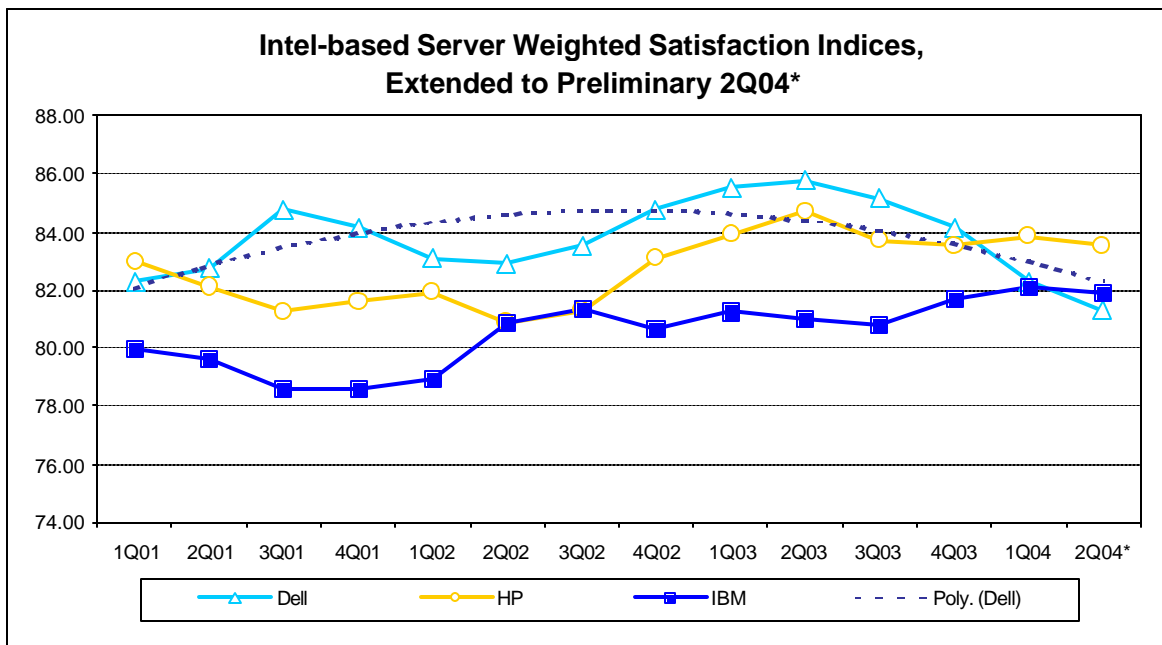
yet satisfaction levels are not as strong as might be expected because customers are ever more critical in their evaluations, based on their investment in the various strategies. Of note is the finding that, in all three vendors' cases, satisfaction with hardware quality continues to decline while the stated importance of the attribute continues to come in at record highs. There is obviously some level of uncertainty and fear at work behind the scenes, or perhaps the expectation has become so critical that it becomes more and more difficult for any vendor to meet the requirement precisely.

The analysis below is based on the possible positioning of the vendors' weighted satisfaction indices in 2Q04 according to the preliminary data, which currently includes half of the intended sample. Because Dell's satisfaction ratings are declining at a faster rate than HP's (an additional 1.2% of Dell's satisfaction index has been eroded between 1Q04 and preliminary 2Q04 interviews), the distance determining HP's leadership position is increasing. At present, the 1.9% distance between HP's and Dell's satisfaction indices in 1Q04 is on the way to increasing to 2.6% in 2Q04. Meanwhile, the 0.25% distance between Dell's and IBM's indices in 1Q04 is increasing, up to 0.72% with the preliminary 2Q04 data. At present, however, this will not be enough to break the shared No. 2 ranking positions between the two vendors in 2Q04. Compared to the 1.2% decline in Dell's weighted satisfaction index between 1Q04 and preliminary 2Q04, HP's score has declined by a modest 0.4% and IBM's by an even more modest 0.2%. *Caution: This analysis is based on preliminary data, just one-half of the required interviews for 2Q04; consequently, these projections must be viewed with care.*



* 2Q04 data January – March 2004; 1Q04: October 2003 – March 2004. Actual 2Q04 data will extend through end of June 2004.

By extending the time line for the Intel-based server weighted satisfaction indices out toward 2Q04 (2Q04 currently contains just the first half of intended interviews for the reporting period), we see that the ranking positions will likely remain in place, with HP at the sole No. 1 position to Dell's and IBM's shared No. 2 position. The further erosion taking place within Dell's weighted satisfaction index causes the HP and IBM data points to appear essentially unchanged. It is their stability in contrast to Dell's downward movement that suggests the marketplace may be changing in terms of what customers consider important and how they propose to solve their IT issues. The polynomial representation of the Dell index trend line suggests the overall decline has been only moderate for the long term; however, the pattern since the early part of CY03 has been fairly steady in terms of a downward trend. While HP's and IBM's positions have improved over time, they have remained more stable in 2003, showing modest improvements. The greater declines within Dell's indices have simply created the opportunity.



* 2Q04 data January – March 2004; 1Q04: October 2003 – March 2004. Actual 2Q04 data will extend through end of June 2004.
 Note: The dotted line represents the polynomial-fitted trend line for Dell.

Behind the Numbers

It is beginning to look like a Platonic dialogue, yet one that more likely confuses than educates the reader. Dell takes the position that the scale-out approach covers the necessary bases, and IBM and HP take the position that it is not enough. And while HP and Dell say innovation must take place within the open standard universe, IBM is perceived as embracing proprietary solutions.

- **Dell:** “Not only is scale-out massively lower cost, it has greater performance and it has higher availability, higher reliability.” (Michael Dell to *InfoWorld*, July 15, 2003)
- **IBM:** “Any database scales up better than it scales out.” (Jay Bretzman, manager, xSeries, internet.com, Aug. 19, 2003) “IBM can help [customers] both scale out with blades and scale up with its x440 server.” (Michael Madigan, vice president of Sales for Sirius Computer Solutions, a large IBM solution provider to *CRN*, Aug. 20, 2003)
- **HP:** “It’s all about more choice. HP provides the most complete range of scalable systems and clusters in the marketplace.” (Winston Prather, vice president and general manager of HP’s HPTC Division)

In the end, it is really not a debate, but rather a presentation of two valid approaches, to be decided ultimately by the specific needs of the customer. The benefit of the scale-out model is potentially lower risk as the application can be spread out over a number of servers; the cons are the added labor burden placed on the IT manager to determine the failover path, at least until better tools become available. The benefit of the scale-up model is that it better supports the needs of powerhouse applications.

It appears from our research that Dell’s scale-out approach is currently winning the cost of ownership debate, as Dell continues to maintain this strong competitive advantage over the competition. Yet, Dell was not the No.1 ranking Intel-based server vendor this quarter. While that honor now belongs to HP, IBM is also making a remarkable level of progress. In order to understand these perceptual shifts, we need to consider the state of the marketplace, now in a period of transition during which innovation is competing against cost-effectiveness. While innovation clearly has begun at the top of the Intel-based server market, an area that goes beyond the limits of this study, times are now changing as we begin to see more innovation moving down into the volume end of the marketplace. This condition may be creating a challenge for Dell in its push to convince customers that its own low-cost solutions can incorporate innovative technologies as well. The Dell position is steadfast; Dell believes the scale-out approach will win, the industry is embracing this approach, and the database software makers have already begun to make that clear in their positions. HP and IBM make the case that the scale-out approach does not embrace innovation and

that, because HP and IBM offer customers more choice, they are more flexible than Dell. TBR believes the jury is still out on this one. Dell continues to perform exceptionally well in our study with regards to its value proposition, and in spite of declining overall satisfaction levels, Dell's customer loyalty ratings have bounced back. Meanwhile, HP has risen to the occasion and presents a strong front when it comes to server manageability features, along with a strong perception of reliability, consistency and support capabilities. IBM has advanced yet another step this quarter by apparently repairing its image with regards to customer relationship management.

The issue with Dell continues to be its growth rate. The vendor achieved record sales with its servers in 2003. Combine this stream of new customers coming in with their likely expectations, which must be extremely high based on the risk of switching to a new vendor and on what they have been hearing regarding Dell's strong customer satisfaction record. The second contributing factor to Dell's declining position has to do with the changing marketplace itself. We have seen Dell customer satisfaction with regards to server management features declining at an increasingly steady rate over time. A virtual chasm now separates Dell's satisfaction position from HP's for this attribute. It is critical that Dell better position its solutions for simplification of server management, since this is one of its proclaimed benefits. The March 9 introduction of VMWare server virtualization tools with all PowerEdge servers is a step in the right direction in that heterogeneous application loads are consolidated onto fewer servers aimed at reducing TCO by providing load balancing across all servers in the cluster. This step should address customer concerns not only regarding server manageability, but also reliability, performance and scalability. Server consolidation as a solution to low server utilization rates where servers lying idle can be put to good use, is a key vendor focus within the industry today. In addition to the VMWare announcement, Dell has recently enhanced its server tool-set focused on its sweeping standardization effort. The combination of these endeavors appears to be in sync with Dell's simplification goal. At present, we are observing a breaking up of customer opinion within the Dell interview base, interrupting the once stable state of Dell customer opinions. This is occurring based on the rapid growth rate combined with changes taking place within the marketplace and Dell's recent reactions, such as the VMWare offerings and announcement to offer Nacona (Xeon 64). Creating partnerships focused on adding scaled-out technologies to Dell's current offerings is yet another tactical approach for Dell. These are all relatively recent efforts and TBR sees this as a timing issue for Dell. We expect all of this may take some time to change the current downward trend in customer satisfaction for Dell. Yet, the plan appears to be a solid one.

For HP, its time may have finally arrived. HP views itself as having successfully transformed itself into a strong contender based on the completed fusion of HP and Compaq. "We've done the heavy lifting; we've integrated the two companies. We've put a deliberate portfolio of products together." (HP spokesman Brian Humphries to *CNET*, Dec. 8, 2003). We are certainly seeing a solid positive reaction among customers to the new HP in the Intel-based server satisfaction segment. Customer opinion has reached a state of unwavering stability. In addition to moderately higher-than-average customer satisfaction ratings regarding on-site support and hardware reliability, increasingly solid performances regarding server management tool satisfaction, combined with durable customer loyalty, HP is closing the gap between itself and Dell in some areas where Dell had historically led the industry. These areas include product delivery time, replacement parts availability and ease of doing business. TBR believes part of HP's success has to do with the company's approach to the Intel-based server marketplace, which focuses on flexibility of choice. This has been enhanced by the company's recent decision to offer Opteron-based servers. HP perceives itself as the happy medium between Dell, which they view as a box builder (the box comes first) and IBM, which they view as too proprietary. HP poses it alone offers the full gamut: "...we can give you an open, standards-based environment, but you don't have to take the risk of a 'roll-your-own' IT infrastructure." (*HPCwire*, March 4, 2004). As we observe HP's customer loyalty rating at an all-time high in our study, it is curious that the company tends to run slightly in the red in terms of the balance between new customers and those that have switched to other brands. Going forward it will be critical for HP to maintain its positions of strength while attempting to better prove its value proposition against that of Dell.

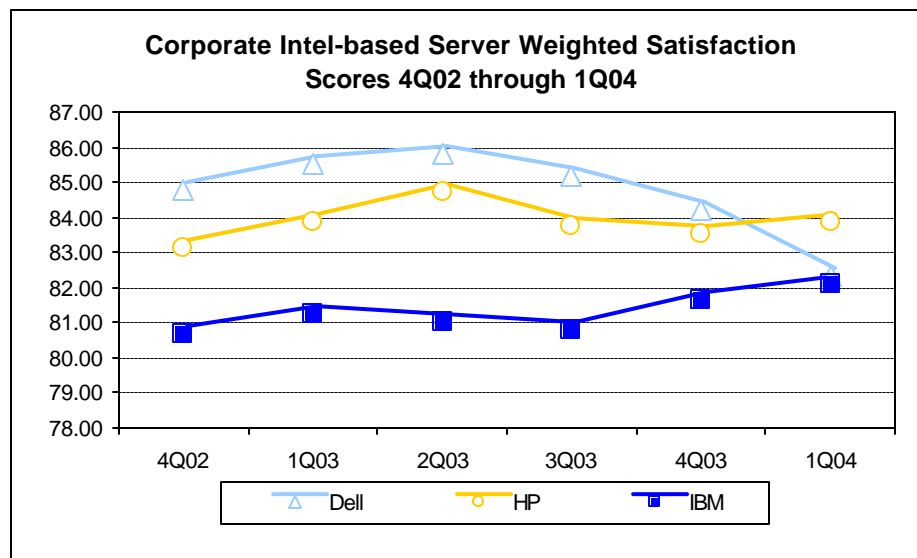
When we consider IBM's past year in the Intel-based server market, it becomes clearer how this vendor has moved from an obscured position in this study to its present state of visibility. According to IDC, IBM had the fastest percentage growth for the past eight quarters in the volume (up to \$25,000) portion of the market and that it even grew faster than Dell in some low end markets. One reason for this growth is that IBM had been targeting Dell customers specifically during the second half of 2003 by offering discounts up to 15% and by offering customers a way to lower costs and simplify systems management (IBM believed Dell was not offering such assistance to customers). The changes we are seeing within the IBM Intel-based server satisfaction data also correlates with an overall shift in customers' perceptions of the company that extends across all product and service lines in our studies. This is the new IBM, under new leadership, with a focus on listening to customers and providing them with

individual, customized solutions. IBM's excellent performance with regards to the new relationship with sales rep is a testament to this new and successful approach. IBM has also been rapidly closing the gap between expectation and satisfaction regarding a historically vulnerable area, ease of doing business. Yet, IBM has yet to solve two areas that currently prevent this vendor from achieving a higher position in the study: product delivery and value. The fact that customer opinion has been tightening up in our studies suggests the recognition is there regarding the new company persona.

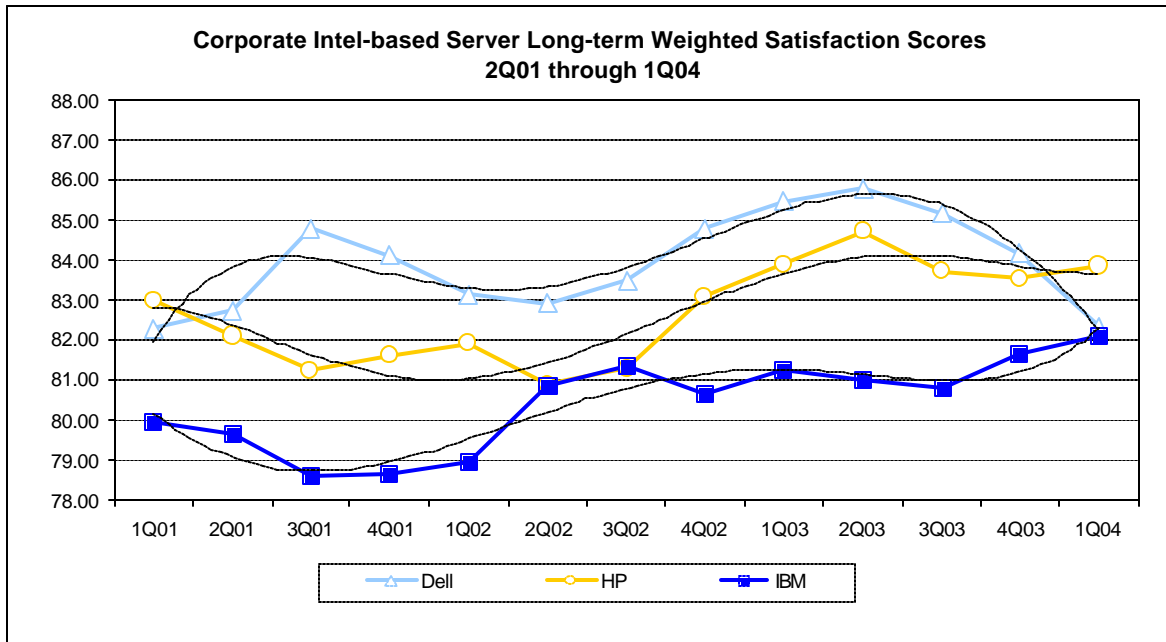
1Q04 ANALYSIS

Tracking the Satisfaction Indices

In considering the patterns of the three competitors' satisfaction indices for the past 18 months, the last two quarters clearly represent a shift in customer perceptions of the three leading players in the Intel-based server marketplace. In 4Q03, we observed a considerable narrowing of the historically solid distance between Dell's and HP's weighted satisfaction ratings. At the same time, we observed a slight tightening of the distance between IBM's index and that of the two leaders. Today, we find the suggestions of 4Q03 have only intensified to create what appears to be a considerable transformation of opinion. While HP's index has remained essentially unchanged, as it has for the past six quarters, Dell's index has dropped by a considerable margin in 1Q04 in order to break the stalemate between HP's and Dell's weighted satisfaction indices, the consequence being that Dell's index has moved to a No. 2 position behind HP, as had occurred once before (1Q01). Subsequent to this, there has been continued upward movement within IBM's satisfaction indices resulting in IBM's index having met Dell's in 1Q04.



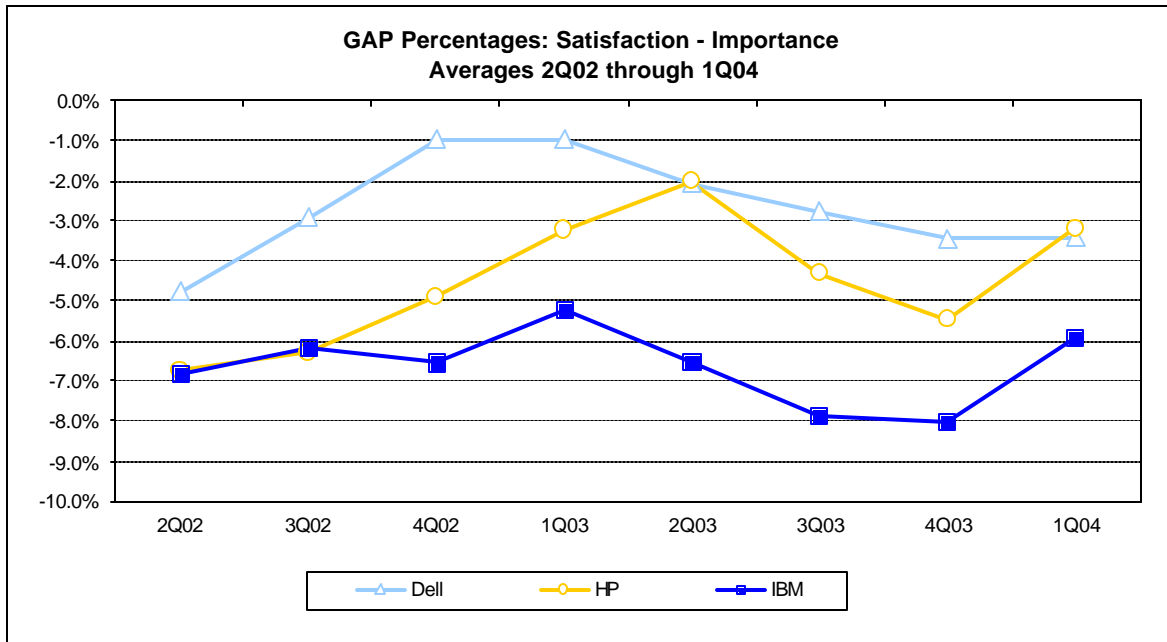
In viewing the progression of weighted satisfaction indices since 1Q01, we find the Dell vs. HP rivalry has come full circle between 1Q01 and 1Q04. During the three-year time period, Dell's ratings reached two peaks where its scores established new highs in the marketplace (one in late CY2001; the other in early CY2003). The dip in 1Q04, however, does represent a new low point for Dell, in that its current weighted satisfaction index is at a lower position than 1Q01. The entire trend line forms an arc-like pattern. HP's trend line has formed more of a steady progression, particularly from 2Q02 to the present. While a setback had been forming between 2Q03 and 4Q03, approximately matching the declining pattern of Dell's indices, the current quarter represents a resistance point to further declines. It appears HP's satisfaction ratings have stabilized. For IBM, the pattern has inarguably been one of steady improvement, characterized by baby steps, having taken off in the 2Q02 time period. Since 2Q02 the pattern has resisted decline, and the past two quarters represent an infusion of relatively strong customer support. Clearly, the Intel-based marketplace has been going through major changes of late, influenced by new product development directions as well as the presentation of two opposing views on the role of the vendor: scale-out or scale-up, both claiming similar advantages in terms of performance, solutions and value. These developments have clearly shaken up the perceptions of customers, and it appears the competition could only get tighter as we move forward.



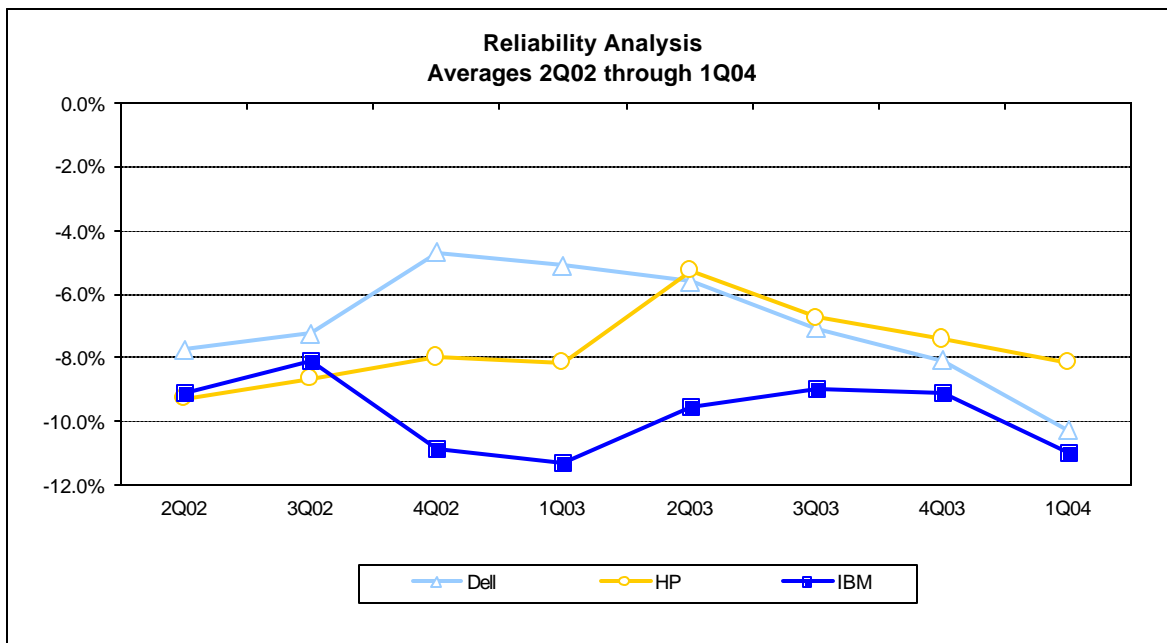
Note: The dotted lines that follow the company series lines represent the polynomial-fitted trend lines.

Vendor Differentiation as Defined by Abilities to Meet Customer Expectations

The following sets of graphs are presented as a consideration of the most critical aspect of the analysis: the abilities of the vendors to interpret and consequently match their customers' expectations. The first example considers how well each Intel-based server vendor meets customer expectations across all of the satisfaction attributes. The goal for any vendor is to be able to meet or exceed the "comfort zone," a GAP rating of -5% or better, with 0% representing having fully met customer expectations and positive percentages meaning expectations have been exceeded. The graph below partially illuminates the reason we are observing a shift of customer perception that appears now to be allowing for equal recognition of each of the three central players in this marketplace. While Dell's GAP scores have moderately moving to the downside, the overall shift appears quite modest and the case could be made that Dell has essentially held its own in terms of meeting customer expectations. Certainly, the overall rating has remained well inside the comfort zone. However, both HP and IBM have improved considerably between 4Q03 and 1Q04, and HP's overall GAP rating is now equal to Dell's. Following a period during which HP's and IBM's abilities to meet customer expectations were falling, the current rebound has been considerable.

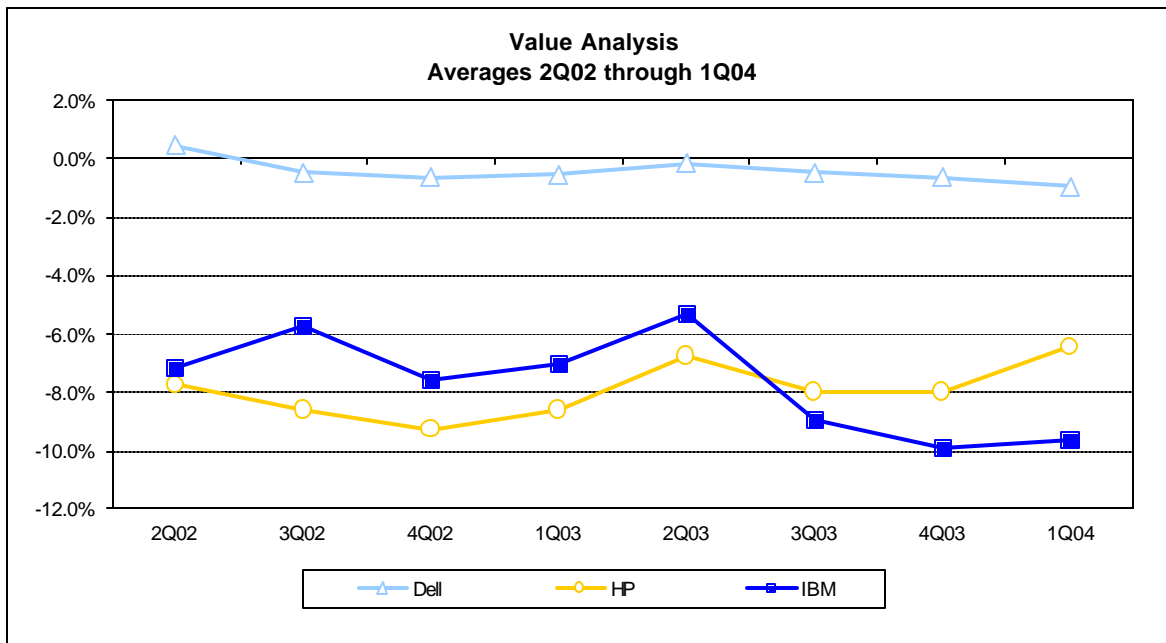


Because of the high expectations regarding server hardware reliability, we tend to grant a wider comfort zone for the vendors regarding these attribute gaps. The requirement is perfection, and in order to satisfy the demand, a vendor would need to receive essentially excellent ratings throughout. All three vendors' GAP ratings have been widening since 2Q03, most notably for Dell. This has been a condition of increasing customer requirements for reliability in this increasingly critical product segment. Customer satisfaction with the hardware reliability is also influenced at a subtle level by the software. While the gaps between expectation and satisfaction have been increasing, the figures have generally remained within the same range of between -4% and -12% over time.

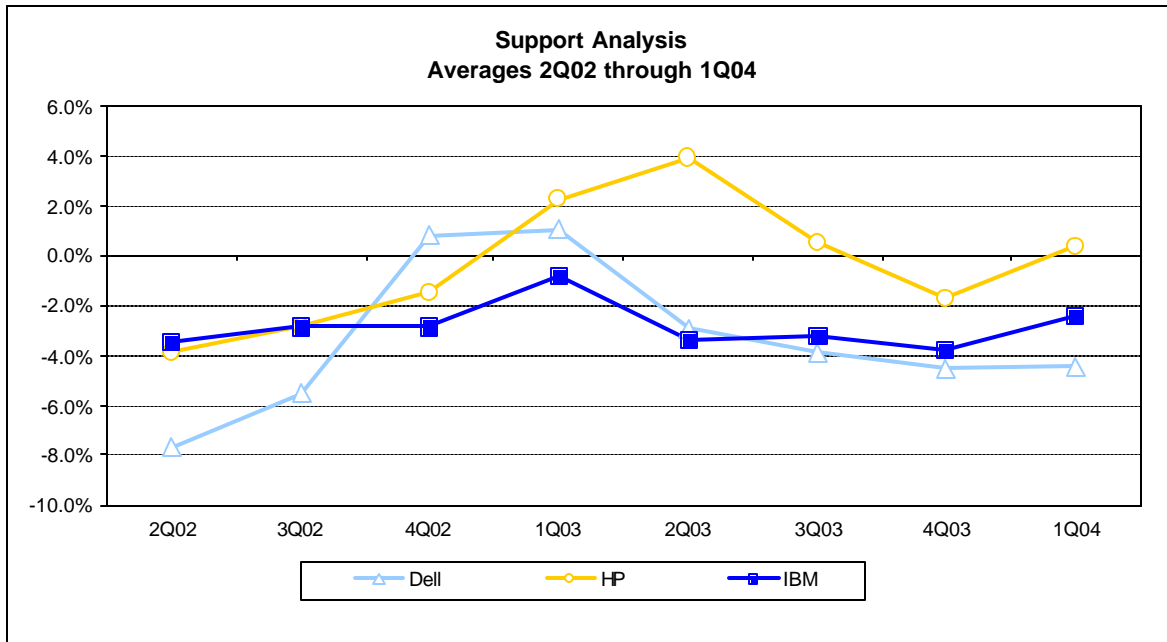


The value analysis reveals the key to Dell's past success in the Intel-based server satisfaction studies, as its gaps have predictably remained in the "black" area of the graphic while its competitors have struggled considerably. 3Q03 represents a time period during which both HP and IBM began to falter even further away from the goal. The

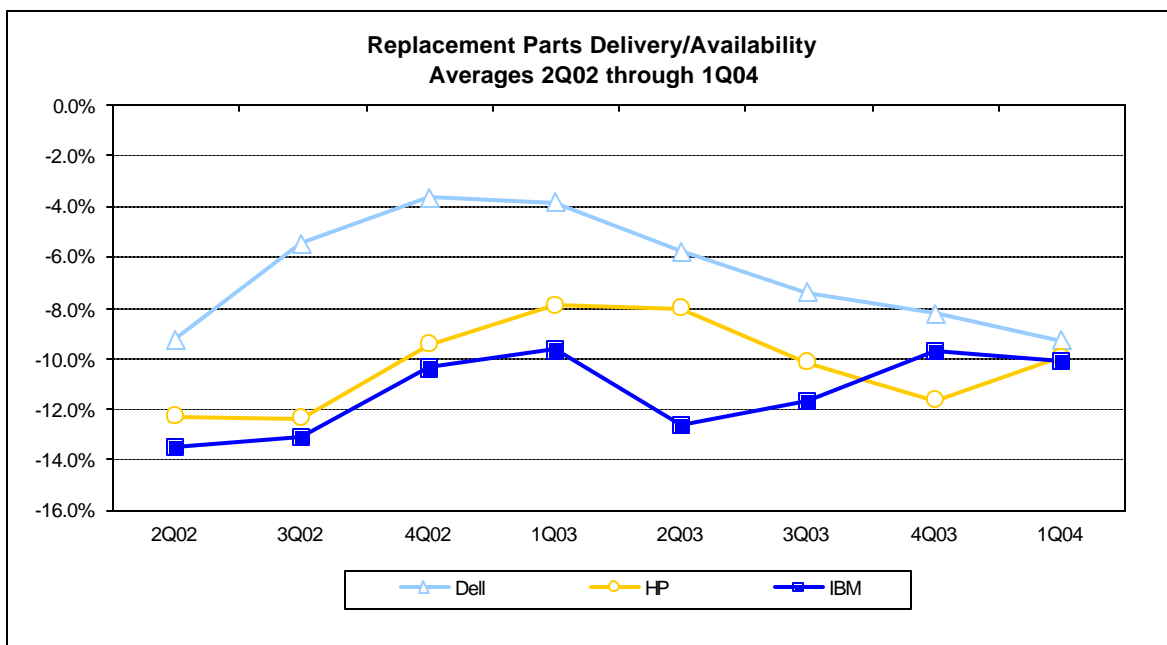
current quarter represents a level of improvement for HP, reflected in the fact that its prior competitive weakness has been softened to a warning area. IBM's rating remains flat. The fact that Dell performs exceptionally with regards to server value, while being unable to retain its No. 1 ranking position, suggests some customers may consider this a trade-off.



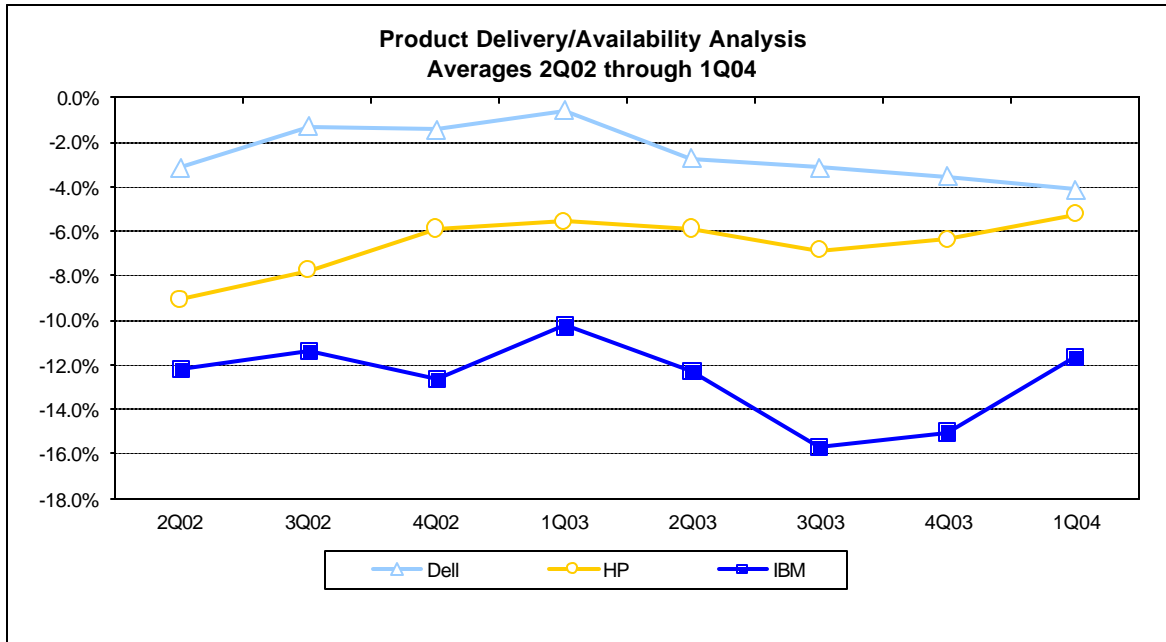
Server support importance generally runs at a more critical level than does client support, thus we find in some cases that server vendors are not meeting customer expectations as well as we might expect. HP has generally performed above the crowd and while Dell's and IBM's current ratings are within the comfort zone, there has consistently been a disconnect between HP's performance and those of Dell and IBM since 2Q03. IBM's ability to meet expectations has been relatively steady, while Dell's GAP ratings have been widening over time. While all vendors do a better job of meeting customer requirements for on-site support (of relatively lower stated importance), there are some differences with regards to phone support. Dell's position has stabilized, yet its -9% gap this quarter measured larger than IBM's -6% and HP's -3%.



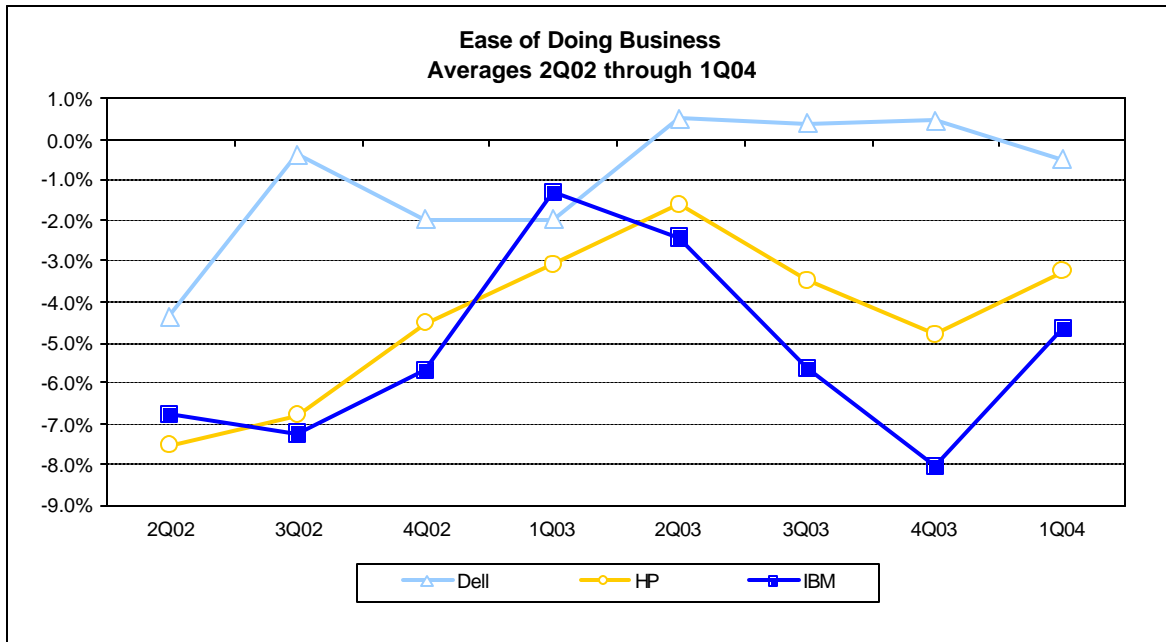
While Dell had set the standard for successfully meeting customers' extremely high demands for availability of replacement parts, the result has steadily been declining over time. Dell's once considerable competitive advantage has clearly been diminished so that for the past two quarters the three competitors have essentially been performing at equivalent levels. In a pattern strongly resembling Dell's overall performance in this study, its GAP ratings for replacement parts availability form an arc-like pattern with a substantial peak in the middle (the 4Q02 to 1Q03 time period). Dell's declining GAP ratings for replacement parts availability have created opportunities for its competitors in spite of the fact competitors have not improved substantially. IBM's GAP ratings for replacement parts availability have improved modestly, from a low of -14% to its current -10%. None of the three competitors are meeting customer expectations as fully as they probably should be. Yet, as with hardware reliability, customers' expectations for replacement parts availability are rather inflated, making it difficult for any vendor to match the expectation precisely. This is particularly difficult when it involves a service rather than a product-related attribute.



Dell and HP had been consistent from 2Q03 to 4Q03 regarding their abilities to meet customer expectations for product delivery and availability. In 1Q04, Dell continued to remain consistent while HP improved to the point that they are both meeting expectations at the same level. IBM continues to flounder with regards to this difficult challenge. Historically, IBM has been unable to close the gap adequately. 1Q04 represents a strong level of improvement, yet competitively IBM remains locked out.



In spite of the fact that Dell has lost its competitive advantage for ease of doing business, its mean satisfaction rating continued to run moderately ahead of the competition in 1Q04. The statistical test for significance, however, was not able to confirm the difference as substantial enough, however, for Dell to retain a competitive strength. The GAP analysis shows Dell's advantage to have remained intact in that its GAP ratings remain at the 0% mark. HP's and IBM's GAP ratings have improved substantially this quarter to the point where they have both reached the comfort zone, meaning that expectations have essentially been met. It appears HP and IBM have simultaneously achieved a recovery with regards to their customer relationship management at a critical time for both vendors.



Trends of the Reporting Period

The satisfaction ratings for 1Q04 have been compared against those from the three previous quarters in an effort to determine root causes for shifts in the weighted satisfaction indices. Since we are now working with samples that are the equivalent of moving averages (with three-month overlaps), we would expect any differences emerging as being indicative of significant change.

The 2.2% decline in Dell’s weighted satisfaction index between 4Q03 and 1Q04 has been driven by declining satisfaction ratings across all of the attribute areas, less so however with regards to server support (both on-site and phone). The most substantial decline during the period has been with regards to server manageability, followed in magnitude by declining satisfaction regarding ease of doing business and overall satisfaction. These are key areas, as server manageability is becoming more of an issue at a time when customers are looking for simplified, centralized management tools. Dell is working to address these needs (see the “Behind the Numbers” section). The decline in ease of doing business satisfaction has allowed the competitors to begin to catch up. The most significant occurrence involves the finding that Dell’s overall satisfaction rating also shows a decline over prior quarters while HP’s and IBM’s have remained solidly intact. For the year, all of Dell’s 1Q04 satisfaction levels represent the lowest points; it has been a progressive rate of decline.

HP’s satisfaction ratings for 1Q04 generally match those of the preceding quarter, thus accounting for the negligible 0.4% change to the upside in its satisfaction index between 4Q03 and 1Q04. The only notable change involves on-site support, where HP’s mean satisfaction rating has increased considerably over the levels of the preceding quarter. For the most part, HP’s satisfaction ratings have remained at comparable levels throughout the year, particularly with regards to overall satisfaction, ease of doing business, overall value and delivery time where the changes have been unperceivable. Phone support satisfaction, however, was at a higher level at the beginning of the year (2Q03) while the drop in the succeeding quarter has remained consistently at the lower level. Overall, HP’s numbers are exhibiting remarkable stability at a time when Dell’s are in a state of flux. It is this condition that largely accounts for HP’s ability to overtake Dell in the ratings this quarter.

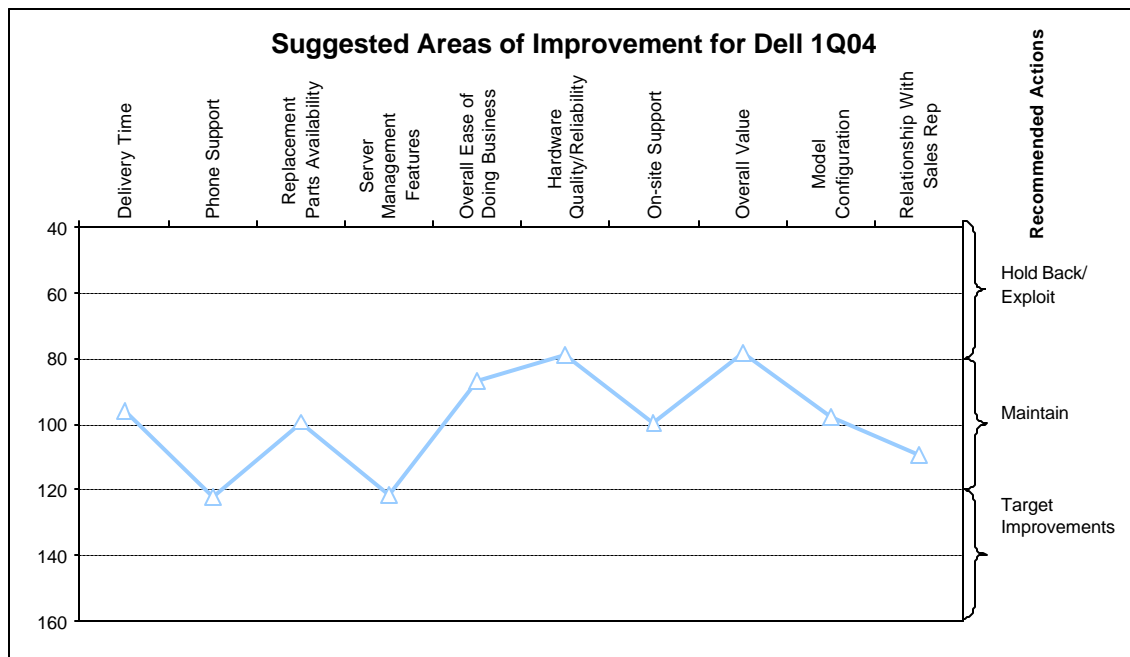
IBM’s weighted satisfaction index moved modestly to the upside (+0.5%) between 4Q03 and 1Q04 driven by two areas where the ratings have increased, albeit moderately: delivery time and ease of doing business. For the year, IBM’s satisfaction ratings for delivery time, on-site support, replacement parts availability and ease of doing business are at their highest levels. Other areas show little overall change, in particular overall value and overall satisfaction, where the ratings have not moved at all for four successive quarters. The situation with IBM is that perceptions have been quite stable over time and small victories have been achieved on a consistent, quarter-by-

quarter basis. One notable shift in the IBM data this quarter involves customer loyalty, which has shot up by an unprecedented margin.

Needed Improvements

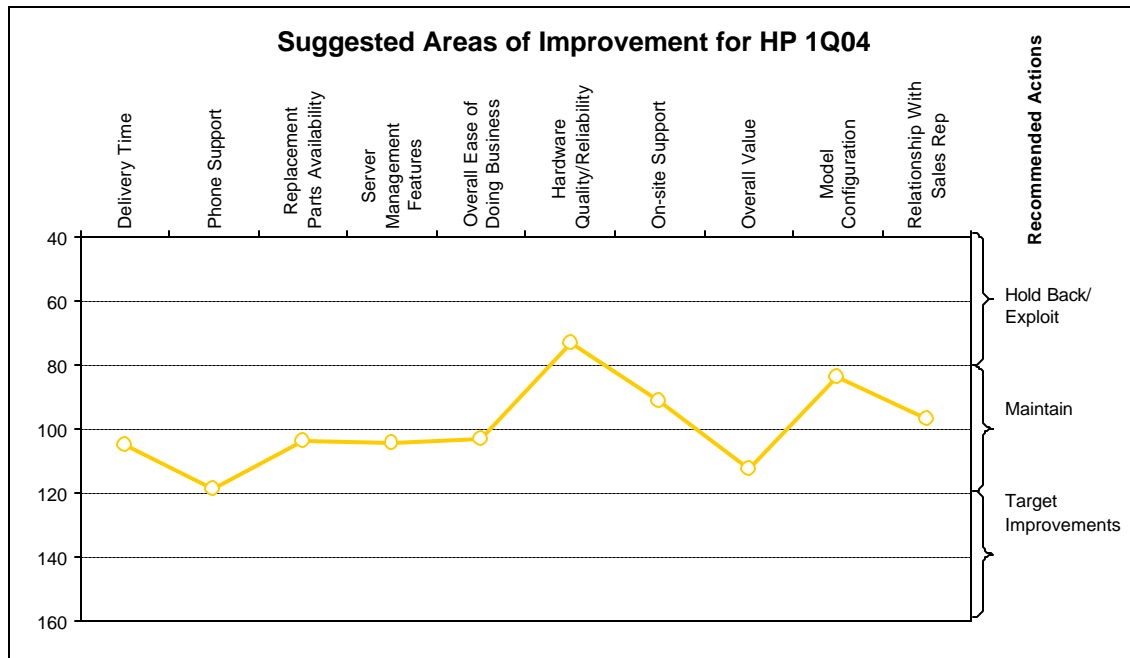
The following analysis presents a method for determining areas where each vendor should theoretically focus its improvement efforts most urgently. Improving customer perceptions in these specific areas would have the greatest value in improving the vendors' positions in this study. TBR uses the average gap between expectation and satisfaction across all of the attributes for each vendor as the standard. Against this, we measure the individual gaps. Those that assert themselves as having much wider gaps than the average are deemed areas most immediately needing attention from the vendor. Against this analysis, we also consider the results of the standard GAP analysis (measuring each vendor's satisfaction performance against that of its customers' expectations, based on stated importance of the attribute).

Two areas emerge as exhibiting inordinately wide gaps between expectation and satisfaction compared to the average gap across all of the attributes in the analysis of Dell's ability to meet customer requirements. Phone support gaps tend to run wider-than-average regardless of vendor, simply because customers tend to rate their vendors lowest for this attribute. This merely implies that the mechanism is difficult to manage and that it may be quite common for customers to experience difficulties. Were a vendor to emerge with a particularly innovative solution to this conundrum, that vendor would likely benefit enormously in this study. Server management feature gaps remain wider-than-average for Dell in spite of lower-than-average expectations. This suggests the difficulty could become more challenging in the future should customer expectations begin to rise. A third area of potential concern for Dell is relationship with sales rep where consistency may be key; however TBR cautions that this attribute has been included in the study for just three months. Dell performs best with regards to hardware quality, an area where we have been observing increasing gaps industrywide. This finding would suggest that the high expectations may actually be met as well as can be expected. The other two areas where Dell has performed exceptionally include overall value and ease of doing business where the gaps were among the narrowest of the series. The standard GAP analysis shows most GAP areas widening (with the exceptions of value and ease of doing business) though no specific areas emerge as exhibiting significant declines. The gap between expectation and satisfaction for phone support remains outside of the comfort zone although its magnitude has stabilized.

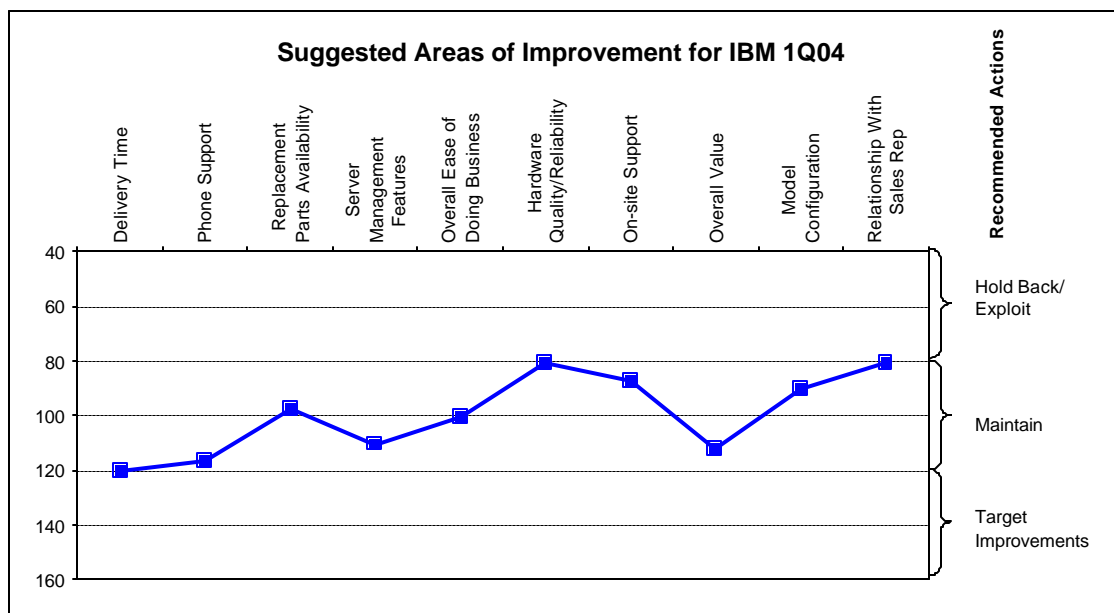


For HP, as with all three vendors, phone support gaps were among the widest of the series. Only one other area emerges as one for continued focus: overall value. While HP has made remarkable progress, TBR believes if the vendor could successfully manage the perception of value, its positioning against Dell would be highly strengthened

in this study. Considering HP's relative strength with regards to server management tools, we believe this could form the basis for a strong total cost of ownership argument. HP performs best with regards to hardware quality, on-site support and model configuration consistency.

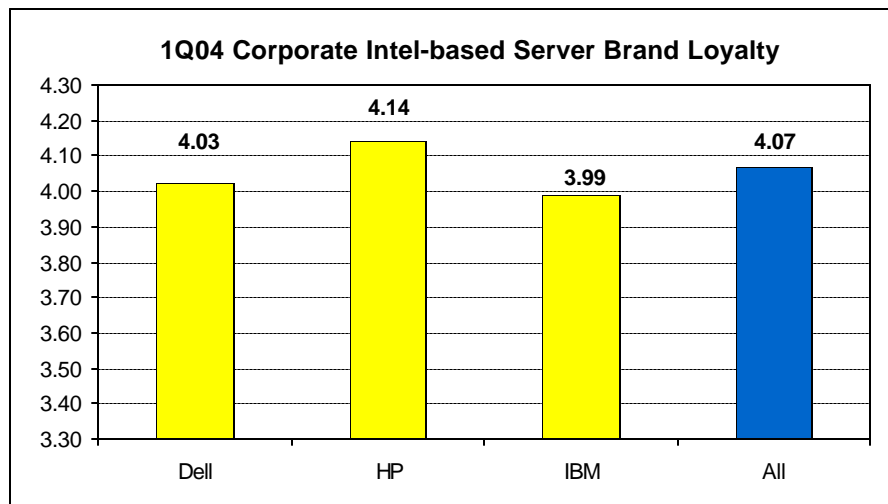


Outside of the fact that phone support gaps run widest regardless of vendor, IBM is most challenged with regards to better meeting customer expectations for delivery time and value. The finding that only two areas emerge as continuing to represent real challenges for IBM is a testament to its broad level of improvement during the past year. IBM's server management feature gap is also wider than it should be, which represents an additional challenge in light of HP's seemingly unapproachable performance in this area over the years. IBM's best performances have been in the areas of hardware quality, on-site support, model configuration consistency and relationship with sales rep. The standard GAP analysis points to delivery time and value as the two areas most out of line competitively, the former against both HP and Dell and the latter primarily against Dell.

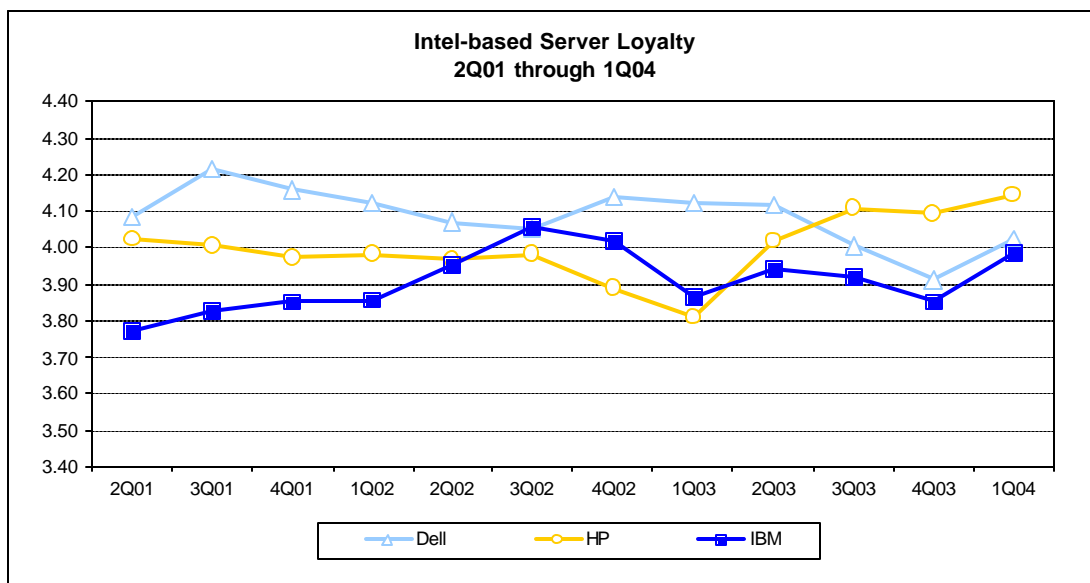


The Loyalty Factor

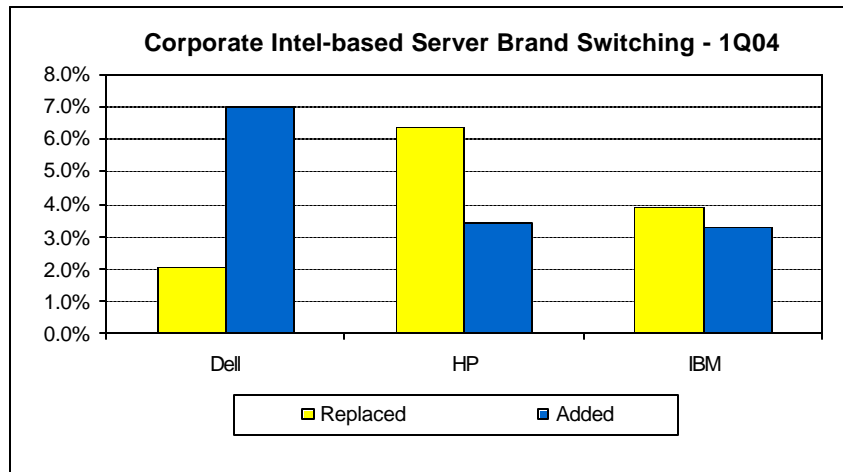
While HP's customer loyalty rating in 4Q03 emerged as significantly higher than both Dell's and IBM's, its dominance has been diminished somewhat this quarter by the fact that both Dell's and IBM's loyalty ratings have increased substantially. While HP's score actually rose by 1% between 4Q03 and 1Q04, Dell's and IBM's rose by higher levels, 3% and close to 4%, respectively. It appears customer loyalty is on the rise, a finding suggesting that customers are interested in locking in their choices, probably considered key at a time when the industry is changing and the stakes are high. The fact that HP has been able to maintain such a high level of loyalty (4.14 is unusually high for a mean customer loyalty rating) is an achievement in itself, as history tells us scores at that level tend to become unstable and certainly do not tend to endure.



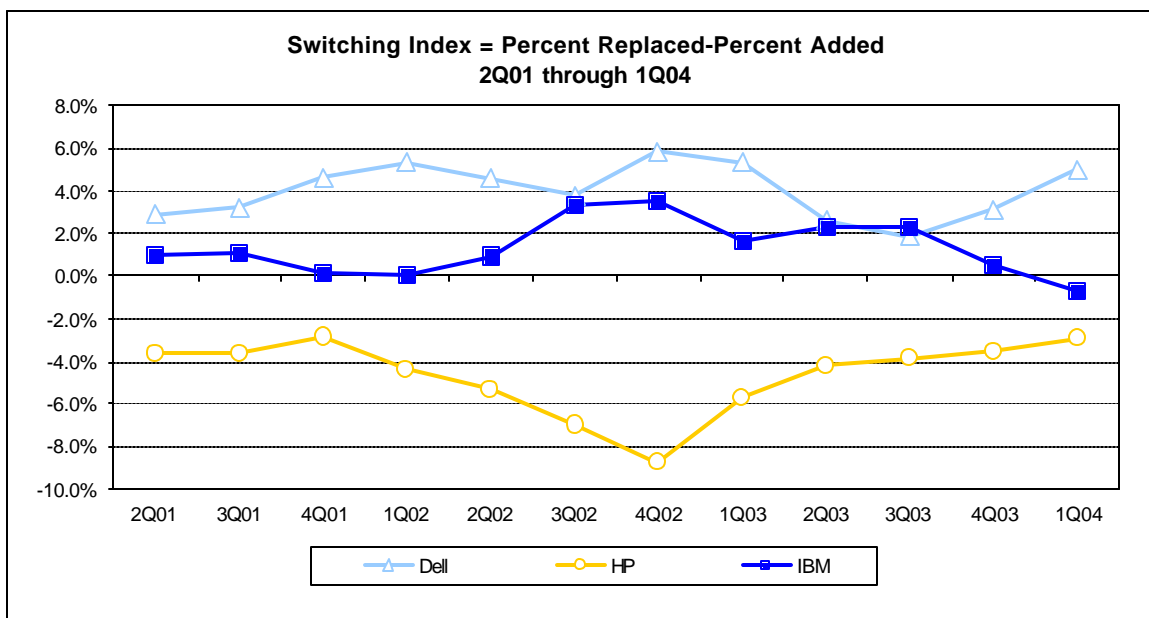
HP's customer loyalty ratings rose substantially beginning in 2Q03, at a time when customer loyalty was bolstered by the final acceptance of the corporate merger and the subsequent higher level of customer confidence in the company's new direction. At the same time, Dell customer loyalty was declining. TBR believed this was related to two factors: an influx of new customers that had not yet determined their level of loyalty and customer uncertainty regarding Dell's scale-out approach to server solutions. The 3% rise in Dell's loyalty rating in 1Q04 is encouraging, as it may be that the customer base is beginning to settle down and to feel more comfortable with their decisions. Yet, a disconnect remains between increasing loyalty and declining satisfaction. For IBM, we have observed increasing satisfaction, to which the uptick in its loyalty rating this quarter is a testament.



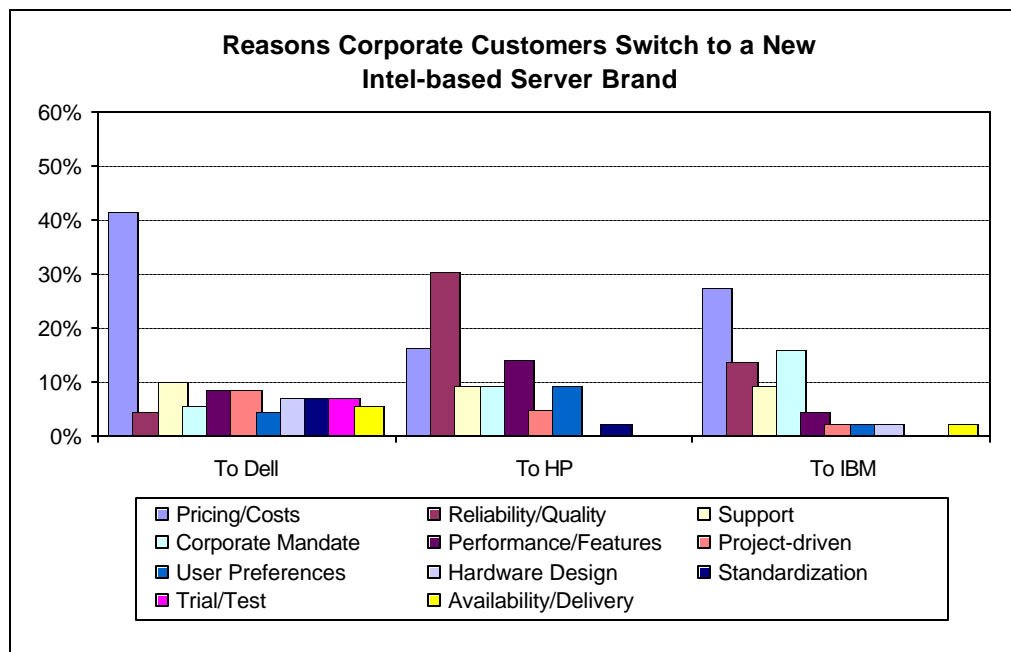
The overall declines in Dell's customer loyalty ratings (with the exception of the 1Q04 rebound) have not yet shown their effects in the brand switching data, which is based on full past-year switches. A larger proportion of customers continue to indicate they have switched to Dell compared to those switching away from Dell. HP continues to lose more accounts than it has gained, clearly based on pricing related decisions, while IBM remains a wash. As we have come to understand in these studies, brand-switching activities do not always correlate with customer loyalty or satisfaction because these decisions are often made by upper management and reasons behind these decisions are not necessarily related to end-user satisfaction. Clearly, the perception of value is a very strong motivator for brand selection while it represents only one component of the customer satisfaction experience.



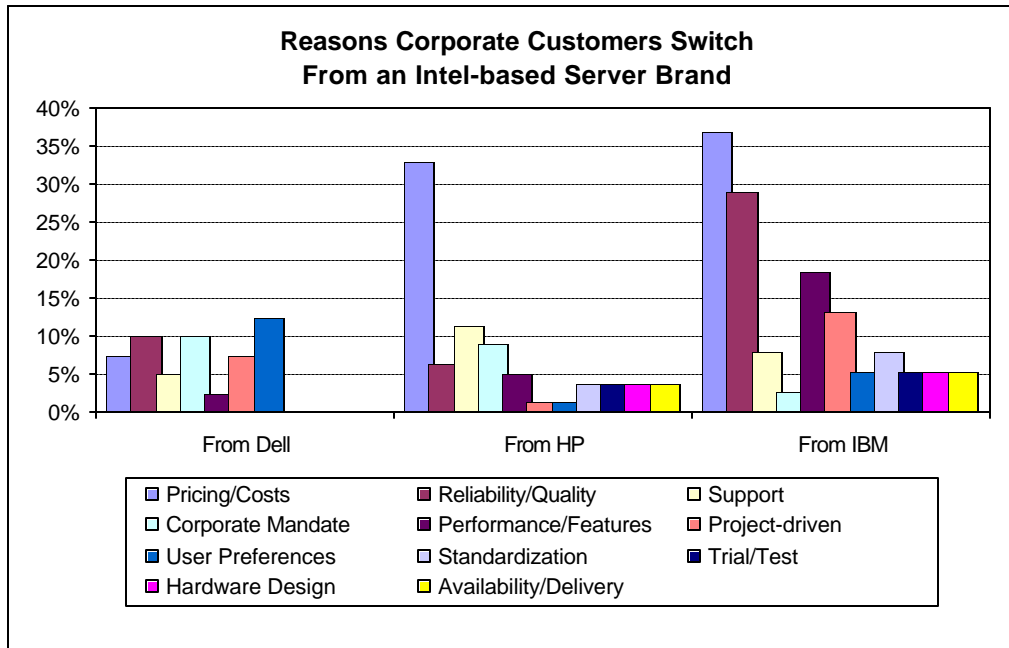
The Switching Index below shows the general regularity by which Dell has added new server accounts, representing net growth in number of customer accounts. Dell customer growth rates appear to be cyclical, the pattern of the switching index showing a number of peaks to have occurred over time. In spite of declining satisfaction levels, Dell is heading into another peak of net gained accounts, most likely based on stressed customer budgets. IBM also manages to keep out of the net loss column, though we might have expected more gains based on recent levels of improvement in both satisfaction and stated customer loyalty. We will expect to see some changes in future quarters. HP remains moderately into the loss column, though the vendor has substantially reduced the number of lost accounts that occurred based on merger-related concerns.



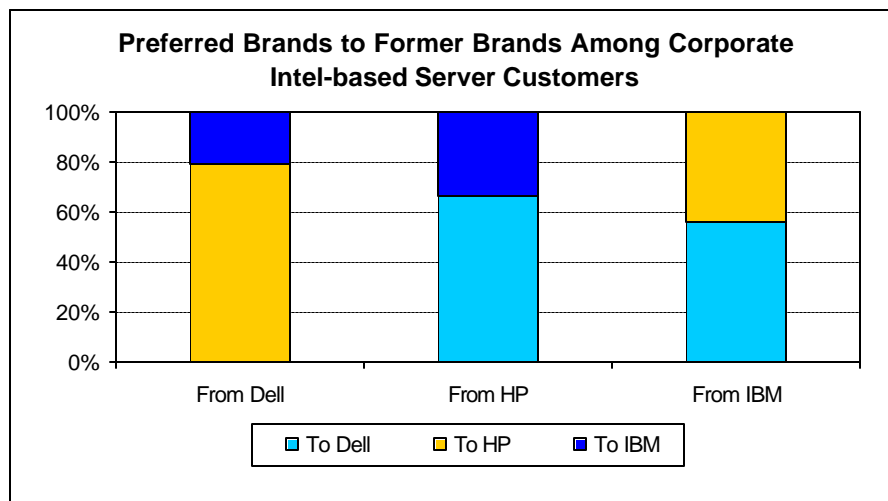
Pricing is the leading reason (30%) customers switch Intel-based server vendors, followed by a number of secondary factors: reliability (14%), support (10%), corporate mandate (10%) and performance/features (9%). Price plays a more dominant role in corporate customers' decisions to switch to Dell servers than to desktops or notebooks. A considerably higher proportion of customers switching to Dell cited pricing as the reason (41%), compared to 27% of those switching to IBM and 16% of those switching to HP. Reliability has largely been a factor in customers choosing to switch to HP (30%, versus 14% IBM and 4% Dell). Hardware performance or features and user preferences also factored more into decisions to switch to HP. IBM customers were the most likely to cite a corporate mandate as the reason, possibly an explanation for IBM's ability to prevent a net loss of accounts, since the sales reps must have a strong influence over upper management at client and prospective client sites.



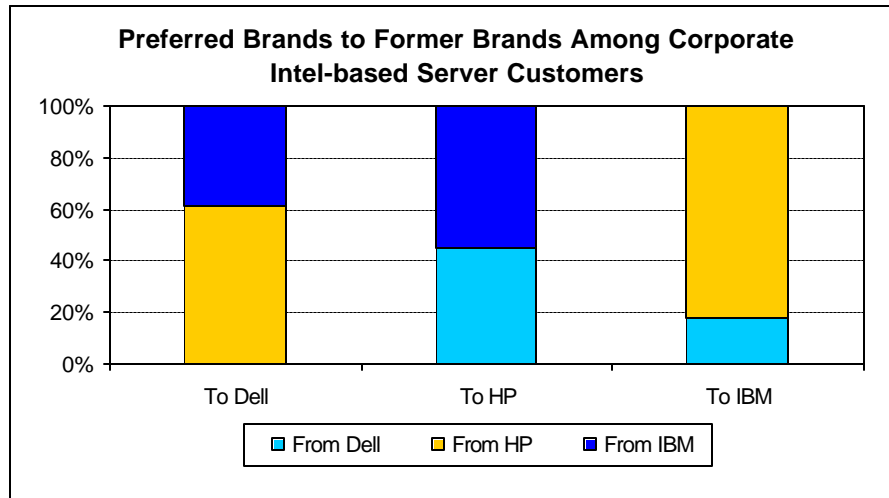
Pricing was overwhelmingly the cited reason for customers switching away from HP (33%) or IBM (37%), while only one in five of such customers switching away from Dell cited price as the underlying reason. Customers switching away from IBM were more likely to have cited reliability concerns (possibly an explanation for the wider spread of opinion with regards to IBM customer satisfaction with hardware quality) or feature concerns (most likely because most IBM customers switched to HP and not Dell). There were no predominant reasons customers decided to switch away from Dell. The reasons were more aligned with the attractiveness of the selected brand rather than due to any shortcoming on the part of Dell. Note also that the base number of respondents was low; just 24 companies reported having switched away from Dell.



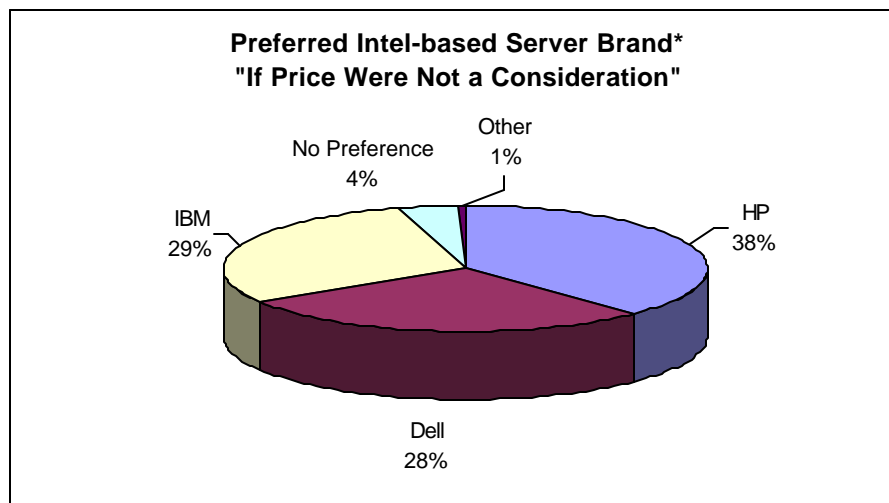
Among the 24 companies switching away from Dell, the majority (80%) selected HP, primarily due to a search for better reliability and features/performance. The 69 companies switching away from HP migrated primarily to Dell (67%), based obviously on pricing concerns. Former IBM customers were less likely to have shown a strong preference for Dell; 56% migrated to Dell and 44% to HP.



Among the 80 companies reporting having switched to Dell servers, the majority migrated from HP (57%) as compared to those switching from IBM (36%). Of the 43 companies switching to HP, 53% switched from IBM servers and 44% from Dell servers. IBM customers (37) were most predominantly likely to have switched over from HP (62%), compared to a small number having switched from Dell (13%). It appears former Dell customers would not feel comfortable with the IBM brand, perhaps because their performance requirements are less.



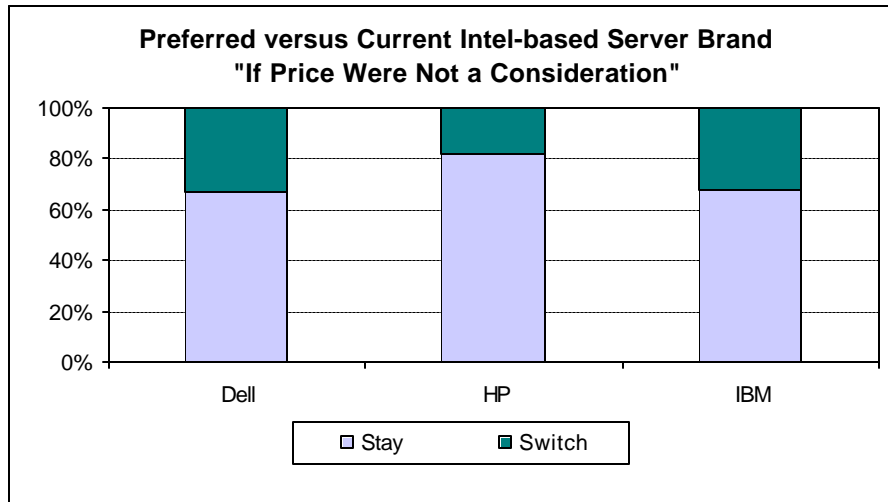
Beginning with 1Q04, TBR asked customers to indicate their preferred Intel-based server brand “if price were not a consideration.” The distribution of customers within the sample included 34% Dell, 43% HP and 23% IBM. Due to the disparities, TBR weighted the respondents’ selections in order to give equal representation to each of the three customer groups. Based on this, HP was the favorite selection, mentioned by 38% of the respondents when asked to indicate their preferred brand irrespective of budget constraints. Dell and IBM were mentioned by an equal proportion of customers (28% to 29%). These results suggest there is somewhat of a preference in the marketplace for the HP ProLiant brand, while Dell and IBM server brands are preferred equally but at a lower level. While Dell has typically been considered the price leader, it is somewhat surprising that so many customers would continue to prefer the Dell brand regardless of price considerations. If they had the opportunity to purchase a brand perceived as costing more, many would prefer to buy Dell. This suggests Dell customers are now focusing on the value of their purchases rather than the price.



* Cases weighted to spread customers equally across HP, Dell and IBM brands.

The likelihood of staying with the current Intel-based server brand when given the opportunity to select any brand regardless of price is generally strong among all three groups. The retention rate among HP customers, however, was somewhat greater than among Dell or IBM customers. Eighty-two percent of HP customers would prefer to continue to buy HP if price were no object, compared to two-thirds of Dell and IBM customers that would stay with their respective brands. This finding suggests some of the customers of Dell and IBM at the lower end of the marketplace (both vendors did well in this segment of the Intel-based server marketplace in 2003) would prefer another brand if their budgets were not obstacles. Dell customers selecting not to stay with Dell were equally divided between preferences for HP or IBM; IBM customers were more likely to select HP if given the opportunity.

In the end, it appears customers perceive Dell as more of a value leader in the Intel-based server marketplace than in the desktop marketplace, where a larger proportion of customers (75%) would stick with their Dell desktops if given the opportunity to select a brand without concern for price. The IBM results are somewhat surprising in that a number of customers would prefer the HP brand, which they clearly perceive as more costly than IBM servers.



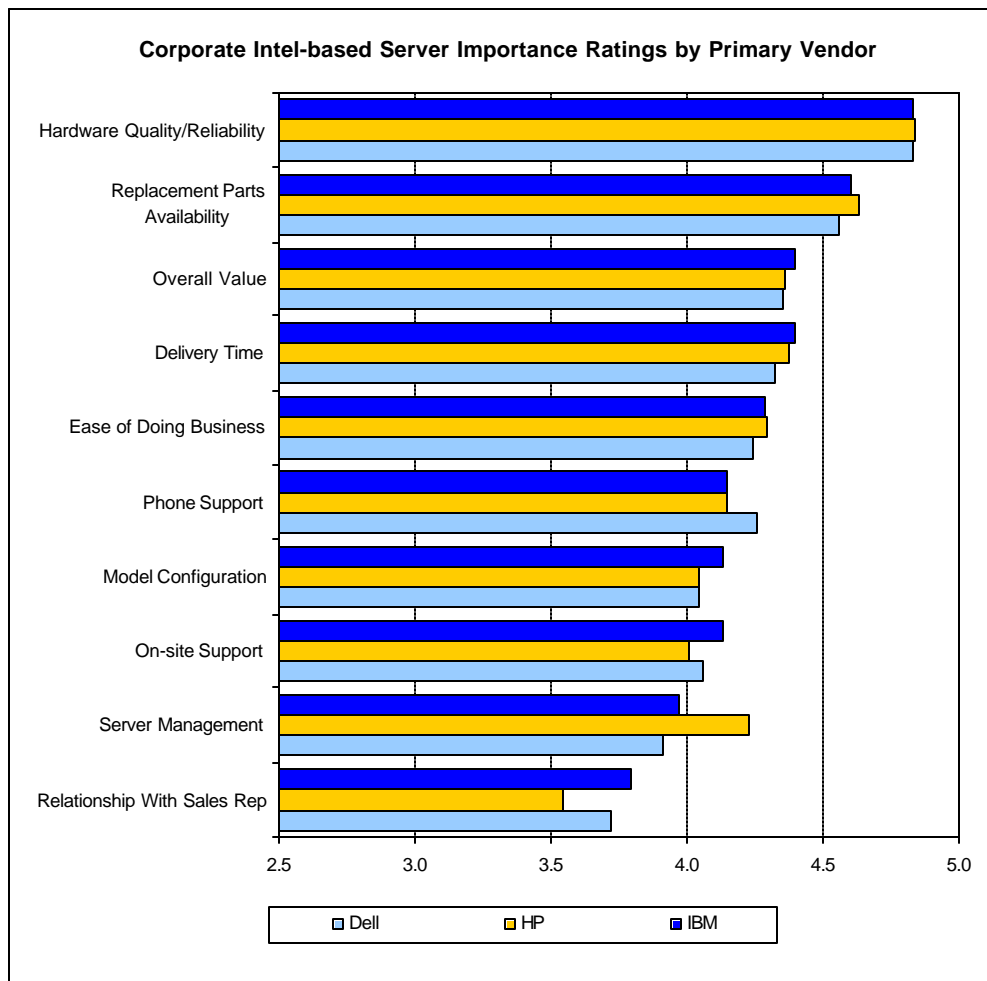
APPENDIX A: ANALYTICAL GRAPHS AND TABLES

Intel-based Server Purchasing Criteria

TBR measures purchasing criteria via two methods: (1) the stated importance of the attributes, as part of the direct interviewing process and (2) the derived importance of the attributes, calculated by comparing the mean satisfaction ratings for each attribute against the overall satisfaction rating. The most critical elements of Intel-based server satisfaction are consistent hardware quality/reliability and replacement parts availability. At the next level, very important attributes include overall value and delivery time. Also important are ease of doing business and phone support. Somewhat important attributes, relatively speaking, include configuration consistency, on-site support and server manageability. Of lesser importance is the relationship with the sales rep.

Priorities are generally comparable across the three groups, though we noted a few important exceptions this quarter:

- **Dell customers:** Placed higher-than-average importance on phone/helpdesk support, due to expectations not having been met recently, consequently placing greater pressure on the vendor to do better. Of less-than-average importance was server manageability.
- **HP customers:** Greater emphasis than either Dell or IBM customers was placed on server management features and less emphasis was placed on relationship with sales rep.
- **IBM customers:** Placed higher-than-average importance on on-site support and configuration consistency.



The derived, versus stated, importance of the attributes can provide a deeper understanding of issues that can affect customer satisfaction and loyalty at a less obvious, or direct, level. An analysis of the factors that contribute to satisfaction in a more subtle way than the importance of the attributes as stated by the respondents is determined via the multiple regression analysis, whereby each attribute score is measured against the overall satisfaction score. When customers tend to score their vendor for overall satisfaction in a similar pattern to the way they score one or more specific individual attributes, these attributes are selected out by the analysis as excellent predictors of overall satisfaction.

TBR cautions these regression results should be evaluated with vigilance due to the method’s limited application in this situation. Many of the attributes are as strongly correlated with one another as they are with the overall satisfaction rating since many of the attributes are similar. There are subtle differences in the attributes, however, and TBR believes it is essential to continue to include all of the selected attributes for coverage in this analysis. The analysis is further complicated by “missing values,” where customers skip a question because it does not apply. Another factor contributing to these words of caution is that the attributes listed ahead of the overall satisfaction rating have a tendency to show up as good predictors of overall satisfaction. The symbols indicate the direction in which the individual attributes influence the overall satisfaction rating: + = positive influence; - = negative influence; 0 = split influence.

Ease of doing business, hardware reliability and pricing/value continue to drive overall Intel-based server customer satisfaction, joined in 1Q04 by the increasing influence of server management features.

For Dell, the factors having the most profound influence over how respondents rate the vendor overall include ease of doing business, hardware quality, server manageability, delivery time and overall value. With the exception of server manageability, all of these have had a positive effect on the overall satisfaction rating. For the second consecutive quarter TBR finds that while Dell customers have underplayed the importance of server management features during a direct query, the way they score server management features does tend to detract from how the respondents rate Dell overall. Consequently, there is a subtle influence evident and that influence is not positive in many cases.

For HP, ease of doing business, hardware quality, server management features, delivery time, on-site support and relationship with sales rep all have had a positive effect on how they perceive HP overall. The overall value perception, however, has had a negative influence on the overall satisfaction rating.

Among IBM customers generally high satisfaction levels with hardware quality, on-site support and ease of doing business have had a positive effect on how they rate their vendor overall, while overall value has had a more negative effect. Satisfaction with server manageability and phone support also influence opinions at a subtle level, and the influence can run either positive or negative, depending on the respondent.

Attributes Driving Overall Satisfaction

	Dell	HP	IBM
Step 1	Ease of doing business (+)	Ease of doing business (+)	Overall hardware quality/reliability (+)
Step 2	Overall hardware quality/reliability (+)	Overall hardware quality/reliability (+)	On-site support (+)
Step 3	Server management (-)	Server management (+)	Overall value (-)
Step 4	Delivery time (+)	Delivery time (+)	Ease of doing business (+)
Step 5	Overall value (+)	Support (+)	Server management (0)
Step 6		Overall value (-)	Phone support (0)
Step 7		Relationship with sales rep (+)	
Total Adjusted R ²	0.57	0.54	0.59

Detailed Satisfaction Ratings and Scoring Comparisons

The following tables summarize the customer satisfaction scores in relation to the means, the standard deviations, the standard errors around the mean and a t-test of each vendor against the sum of its competitors.

The level of spread across customer perceptions is relatively tight across the three major customer groups. It is interesting to consider the changes over past periods, as tightening opinion spread generally signifies improvement, while widening opinion may signal overall declining opinion. Dell's average standard deviation measurement is currently at 1.12, approximately equal with the preceding quarter's 1.15; yet, opinions are more spread than they had been a year ago. HP's have remained essentially unchanged, from 1.09 in 4Q03 to 1.04 for the current quarter. HP customer opinions appear to be somewhat more solid in terms of general levels of agreement among the customers interviewed, than among Dell or IBM customers. IBM's level of improvement is reflected in the tightening up of opinions this quarter, with an average standard deviation measurement of 1.09, compared to 1.17 in the preceding quarter.

Summary of Satisfaction Scores by Vendor

Vendor	On-time Reliable Delivery	Hardware Quality	On-site Support	Phone Support	Replacement Parts Availability	Server Management Features/Ease of Management
Dell						
Mean	5.81	6.13	5.69	5.48	5.84	5.35
Standard Deviation	1.14	0.86	1.10	1.20	1.30*	1.30*
Standard Error	2.48%	1.76%	2.90%	2.90%	2.88%	3.22%
High of Range	5.96	6.24	5.86	5.63	6.01	5.52
Low of Range	5.67	6.02	5.53	5.32	5.67	5.17
t-Test	0.29	0.30	<u>0.07</u>	0.44	0.61	0.00
HP						
Mean	5.83	6.26	5.89	5.60	5.91	5.79
Standard Deviation	1.06	0.83	1.00	1.28	1.08	1.06
Standard Error	2.04%	1.48%	2.29%	2.81%	2.09%	2.10%
High of Range	5.95	6.35	6.02	5.76	6.03	5.91
Low of Range	5.71	6.17	5.75	5.44	5.78	5.67
t-Test	0.12	0.03	0.18	0.23	0.49	0.00
IBM						
Mean	5.52	6.10	5.86	5.48	5.86	5.50
Standard Deviation	1.34*	1.02*	1.06	1.23	1.07	1.20
Standard Error	3.70%	2.54%	3.19%	3.66%	2.90%	3.53%
High of Range	5.72	6.25	6.04	5.68	6.03	5.69
Low of Range	5.31	5.94	5.67	5.28	5.69	5.30
t-Test	0.01	0.22	0.61	0.60	0.83	0.36

Note: The items in bold are t-tests significant at the 0.05 level or less; those underlined are at the 0.06 to 0.10 significance level. Standard deviation measurements marked with an asterisk are those significantly higher than average; those in bold are significantly lower than average.

Summary of Satisfaction Scores by Vendor

Vendor	Overall Value	Overall Ease of Doing Business	Model Configuration Consistency	Relationship With Sales Rep	Overall Satisfaction
Dell					
Mean	6.04	5.91	5.71	5.43	5.91
Standard Deviation	0.88	1.14	1.09*	1.32*	1.00
Standard Error	1.85%	2.44%	4.10%	5.46%	2.14%
High of Range	6.15	6.05	5.94	5.73	6.04
Low of Range	5.93	5.76	5.48	5.14	5.78
t-Test	0.00	0.20	0.15	<u>0.07</u>	0.86

Vendor	Overall Value	Overall Ease of Doing Business	Model Configuration Consistency	Relationship With Sales Rep	Overall Satisfaction
HP					
Mean	5.74	5.82	5.99	5.66	5.99
Standard Deviation	0.95	1.15	0.96	1.14	0.98
Standard Error	1.88%	2.24%	3.40%	4.51%	1.82%
High of Range	5.85	5.95	6.19	5.92	6.10
Low of Range	5.63	5.69	5.78	5.41	5.88
t-Test	<u>0.07</u>	0.86	<u>0.09</u>	0.84	<u>0.08</u>
IBM					
Mean	5.62	5.73	5.82	5.85	5.80
Standard Deviation	1.10*	1.17	0.85	0.89	1.04
Standard Error	3.02%	3.14%	3.45%	3.65%	2.73%
High of Range	5.79	5.91	6.02	6.06	5.95
Low of Range	5.45	5.55	5.62	5.64	5.64
t-Test	0.01	0.23	0.83	0.04	<u>0.08</u>

Note: The items in bold are t-tests significant at the 0.05 level or less; those underlined are at the 0.06 to 0.10 significance level. Standard deviation measurements marked with an asterisk are those significantly higher than average; those in bold are lower than average.

Dell customer opinions were more cohesive than others in their perceptions exclusively regarding value, while opinions have been breaking up with regards to three attributes: replacement parts availability, configuration consistency and relationship with sales rep.

HP’s customers showed strong opinion consensus regarding replacement parts availability and server management features, the latter an historical area of strength for the vendor and the former an area where perceptual differences (historically showing Dell in the lead) have been disappearing. There were no areas where HP customer opinion showed wider-than-average spread.

IBM customers expressed stronger-than-average opinion consensus across the areas of replacement parts availability, configuration consistency and relationship with sales rep. Opinions became more divided with respect to delivery time (an historical finding), hardware quality (while IBM performed well in general, there were some issues with some customers among those indicating they had switched away from the IBM brand) and value.

This is key information, as it points to where vendors show strength in terms of the message they are getting through to customers and where they may be “letting things go.”

We have been tracking Dell’s server support statistics closely due to issues in the past that we felt had been largely on the mend. This quarter, Dell’s server support satisfaction ratings have remained stable. Its phone support satisfaction rating has stabilized (5.53 in 4Q03 vs. 5.48 in 1Q04), while opinions have tightened up somewhat (from 2.52 standard deviation in 4Q03 to 1.20 in 1Q04). Compared to the competition, Dell’s phone support satisfaction rating is precisely on target. Last quarter, TBR indicated Dell customer perceptions of its on-site support for servers may be becoming less competitive. While the satisfaction levels have remained constant between 4Q03 and 1Q04 and opinion spread has remained stable, Dell continues to marginally underperform the competition.

Low or average standard deviation with higher- or lower-than average satisfaction shows customer experiences have been relatively uniform and the vendor has reached a point of consistency, either for the good of the customer, or because needed improvements have not been made. The following incidences apply to this rule:

- **Dell:** On-site support, where customer satisfaction was marginally below average accompanied by relative agreement, and overall value where customers were in general agreement regarding their high levels of satisfaction.
- **HP:** Customer satisfaction with hardware quality and server manageability ran considerably higher-than-average with strong opinion consensus, while satisfaction with value trended lower-than-average with general agreement. Configuration management and overall satisfaction were marginally higher-than-average satisfaction with general opinion consensus.
- **IBM:** Strong opinion consensus accompanied higher-than-average satisfaction for relationship with sales rep.

High standard deviation with lower-than-average satisfaction shows customer experiences have been variable. The cause could be due to market share growth (new customers coming in with different expectations), or a change being implemented by the vendor. Below are this quarter's examples of this phenomenon:

- **Dell:** Satisfaction with both server manageability and relationship with sales rep were significantly below average, influenced by factions of less satisfied customers dragging down the averages.
- **HP:** None.
- **IBM:** Satisfaction with delivery time and overall value showed lower-than-average satisfaction, influenced to the downside by a smaller number of less satisfied customers. This would suggest that there are some IBM customers with relatively high satisfaction with the value of their acquisitions, likely dependent on the customers' unique requirements.

The t-tests for significance results are summarized on the following pages. The first test measures each vendor's satisfaction ratings against the sum of its competitors'. Consequently, a positive t-test means the vendor's score is either significantly greater than or less than that of all its competitors, but not necessarily against any one of its competitors alone. TBR cites a positive t-test finding when the α level equals 0.05 or less, indicating a 95% probability that the assumption that the two means are different is correct. As an additional reference point, TBR also cites t-tests that test positive at the 0.10-significance level (those lying between 0.05 and 0.10).

Dell continues to exhibit its most impressive strength with regards to the perception of value, where its ratings were determined to have run significantly above the average of its competitors' in 1Q04 as in all prior quarters. Satisfaction with server manageability continues to run considerably below the industry average. While at a less convincing confidence level, Dell's ratings for on-site support and relationship with sales rep trended lower than the group average. Due to changing dynamics (improved delivery time on the part of HP, and improved ease of doing business ratings for both of Dell's competitors), Dell's scores no longer excel over the competition with regards to both of these attribute areas.

HP continues to show competitive strength with regards to server management features and hardware quality/reliability, both areas showing significantly higher-than-average ratings against both competitors. HP's loyalty rating, while remaining considerably high in contrast to the mean ratings of its competitors (4.14 HP versus 4.03 Dell and 3.99 IBM), could not be confirmed as significantly higher than average at the preferred 0.05 or lower level of confidence. Nonetheless, we would say HP's customer loyalty rating continues to trend higher than average. HP's overall value rating was determined to have run lower than average at the less convincing level of confidence, comparable to last quarter's TCO rating.

IBM continues to score significantly below the industry average for delivery time and overall value satisfaction, while overall satisfaction has fallen below average yet at the less convincing level of confidence. Due to strong levels of improvement, IBM's loyalty rating came in about average this quarter. The new attribute relationship with sales rep showed IBM to have significantly outperformed the industry average.

Utilizing the point system where high-confidence statistically significant differences are summed, HP comes in with an edge over the competition with a total of two points (positive), compared to 0 points for Dell and -1 for IBM.

Results of the Standard t-Test

Vendor	Dell	HP	IBM
On-time Reliable Delivery			↓
Hardware Quality		↑	
On-site Support	↓		
Phone Support			
Replacement Parts Availability			
Server Management Features/Ease of Management	↓	↑	
Overall Value	↑	↓	↓
Overall Ease of Doing Business			
Model Configuration		↑	
Relationship With Sales Rep	↓		↑
Overall Satisfaction		↑	↓
Customer Loyalty		↑	
Grand Mean		↑	↓

↑ t-test is significantly higher than average of competitors; ↓ t-test is significantly lower than average of competitors. Smaller arrows represent significant differences at the 0.06 to 0.10 confidence levels.

A second set of t-tests was run in pairs in order to determine exactly where the differences lie. Dell continued to outperform its competitors significantly for pricing/value satisfaction yet has lost its prior edge with regards to ease of doing business, an area where the three vendors' ratings are now nearly equal. Against HP, Dell continued to underperform by a considerable margin for server management features, and while its loyalty rating also was considerably below HP's in 1Q04, the statistical tests did not confirm that gap. Against IBM, Dell continued to score significantly higher regarding delivery time, along with overall value, yet its overall satisfaction rating did not measure appreciably higher than IBM's. In the new attribute area relationship with sales rep, Dell's ratings were significantly below IBM's.

At a less convincing level of confidence, HP marginally outperformed Dell this quarter with regards to hardware quality/reliability, on-site support and model configuration consistency. Against IBM, HP continued to perform significantly better in the areas of delivery time, server management features and overall satisfaction. HP's loyalty rating, while trending higher, could not be confirmed at a reliable confidence level as having outscored IBM. HP also did not significantly outperform IBM regarding ease of doing business as customer perceptions of this attribute have merged in 1Q04.

IBM continued to underperform both competitors significantly for delivery time, an area that continues to represent a daunting challenge for this vendor. In contrast to previous quarters, IBM did not underperform its competition this quarter in the area of ease of doing business. This represents a considerable achievement, and the positive aspects of customer relationship management are echoed in IBM's strong performance in the new attribute area, relationship with sales rep.

Overall, HP's performance came in significantly higher than competitors in a total of four incidences to Dell's three. When we factor in the incidences where Dell scored significantly below average, Dell's net wins have been reduced to one, while HP's remain relatively strong at three because there was only one occurrence where HP performed below par (against Dell for overall value). Contrast this to the two areas where Dell's scores were significantly below par (server manageability against HP and relationship with sales rep against IBM). IBM had one competitive win (relationship with sales rep against Dell) compared to a total of five incidences where its ratings were significantly below competitors, for a net score of -4.

Results of Paired t-Tests

Pair-wise t-Tests	Dell vs.		HP vs.		IBM vs.	
	HP	IBM	Dell	IBM	Dell	HP
On-time Reliable Delivery		↑		↑	↓	↓
Hardware Quality	↓		↑	↑		↓
On-site Support	↓		↑			
Phone Support						
Replacement Parts Availability						
Server Management Features	↓		↑	↑		↓
Overall Value	↑	↑	↓		↓	
Overall Ease of Doing Business						
Model Configuration	↓		↑			
Relationship With Sales Rep		↓			↑	
Overall Satisfaction				↑		↓
Customer Loyalty						
Grand Mean	↓		↑	↑		↓

↑ t-test is significantly higher than average of competitors; ↓ t-test is significantly lower than average of competitors. Smaller arrows represent significant differences at the 0.06 to 0.10 confidence levels.

We can take the analysis a step further by using the bonferroni correction, a procedure recommended by statisticians whenever results are in question. The procedure is conservative; the overall significance level might be much smaller than α equals 0.05. When a standard t-test runs positive, but is not confirmed by the bonferroni, a point is not assigned in favor of or against the vendor for that attribute for the t-test portion of the calculation regarding vendor strengths and weaknesses (see the “Executive Summary”). Since this procedure compares each Intel-based server vendor to each competitor separately, the analysis also provides a more in-depth understanding of the essential differences in customer perception by vendor.

The bonferroni correction test confirms all but one of the major tests determined by the standard t-test at the more reliable confidence level. The test was unable to confirm HP performed significantly better than IBM for overall satisfaction.

HP’s overall performance was somewhat better than Dell’s, which in turn brought in a better performance than did IBM. We utilize a point system (-1 for any vendor having been outperformed by a competitor, +1 for a win and +2 for a double win) to compare the performances of the three vendors. HP comes in with a score of +1 point (two positives for delivery time and server management features, lessened by 1 negative point for value) compared to 0 points for Dell (two wins, one for delivery time and one for value cancelled out by two negatives, one for server management and one for sales rep relationship) and -2 points for IBM (three negatives for delivery time, server management and value, lessened by one positive for relationship with sales rep).

Differences Between the Vendors According to Bonferroni Correction

Attribute	Significant Differences Cited	Dell Pts.	HP Pts.	IBM Pts.	Confirmation of Standard t-Test
On-time Reliable Delivery	Dell and HP over IBM	1	1	-1	Yes
Hardware Quality	None of note at 0.05 significance level				Yes
On-site Support	None of note at 0.05 significance level				Yes
Phone Support	None of note at 0.05 significance level				Yes
Replacement Parts Availability	None of note at 0.05 significance level				Yes
Server Management Features	HP over Dell and IBM	-1	1	-1	Yes
Overall Value	Dell over HP and IBM	1	-1	-1	Yes
Overall Ease of Doing Business	None of note at 0.05 significance level				Yes

Attribute	Significant Differences Cited	Dell Pts.	HP Pts.	IBM Pts.	Confirmation of Standard t-Test
Model configuration	None of note at 0.05 significance level				Yes
Relationship With Sales Rep	IBM over Dell (at 0.09 significance level)	-1		1	Yes
Overall Satisfaction	None of note at 0.05 significance level				HP not greater than
Customer Loyalty	None of note at 0.05 significance level				Yes
Total Points		0	1	-2	Yes

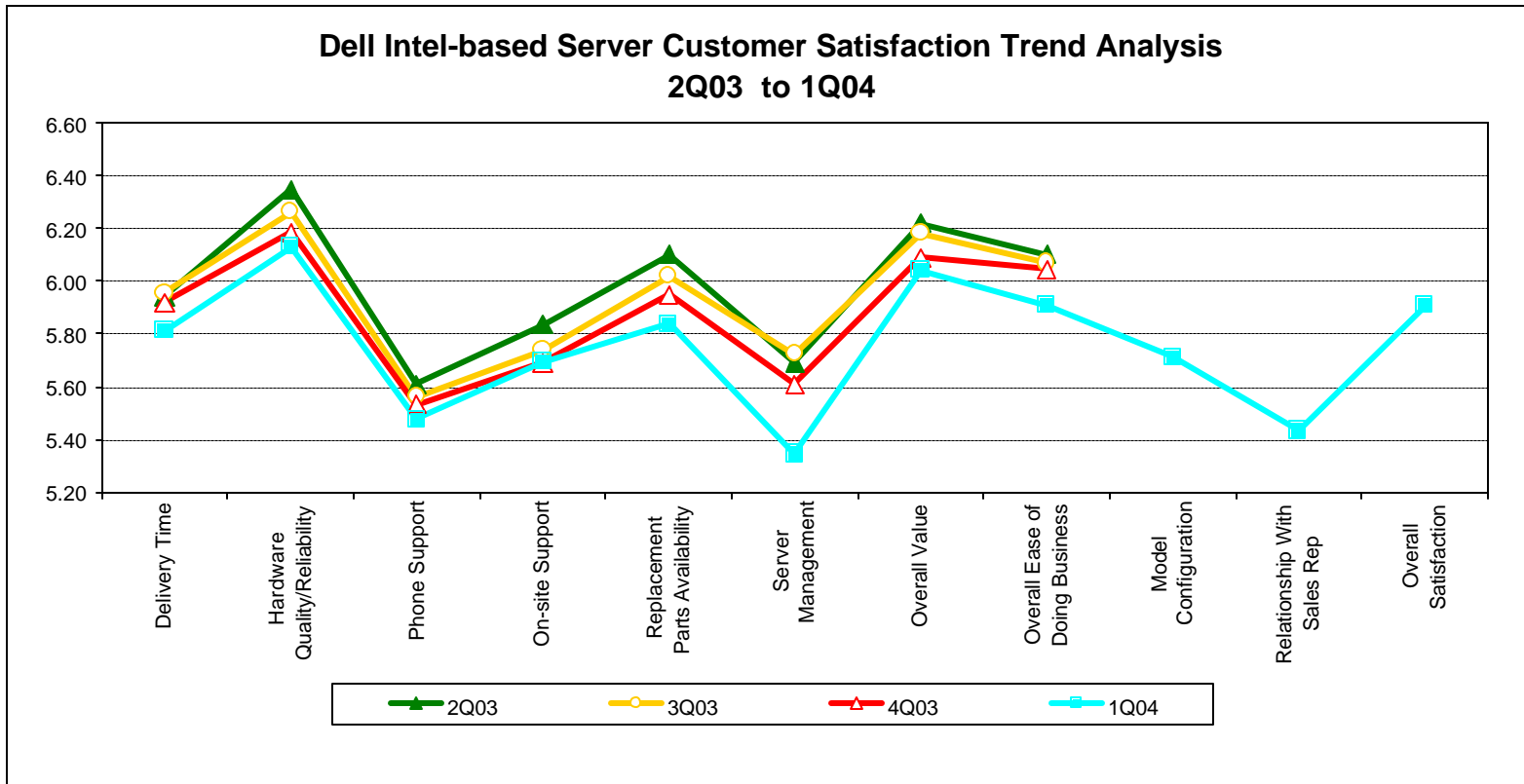
Quarter-to-Quarter Trends Analyses

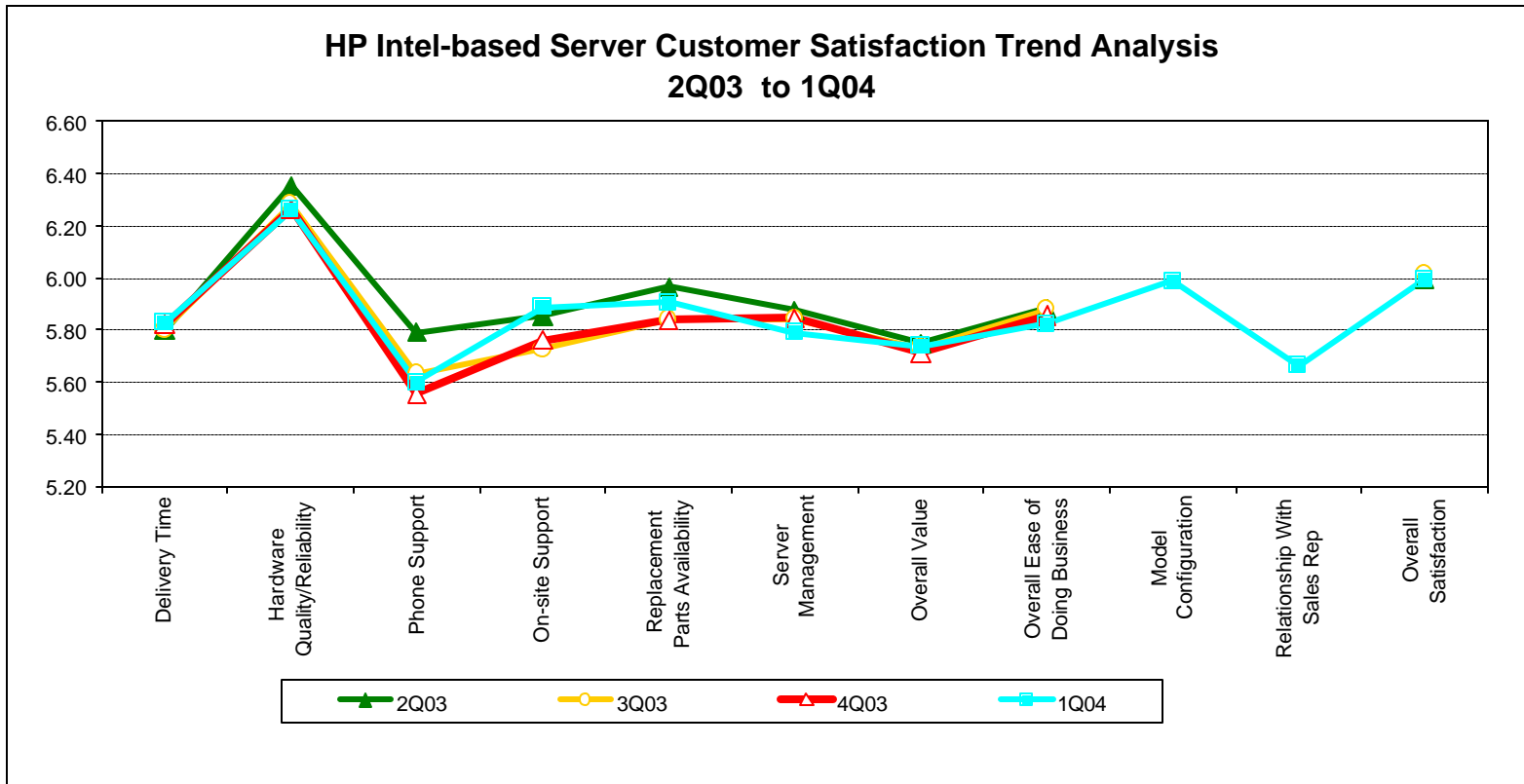
The following graphs plot significant improvements or declines in the vendors' satisfaction scores when compared to the previous reporting period and the alternate reporting period. Comparisons against the alternate reporting period provide better measures of real change because TBR interviews many of the same companies in alternate reporting periods, including the panel members. If panel members' opinions begin to shift, one can be certain the change is real and a new pattern has emerged. The graphs represent the mean ratings for each of the three overlapping time periods (based on six-month moving averages). Areas where the lines leave a clearly visible gap are areas of significant change between each period, though such extreme shifts are rare.

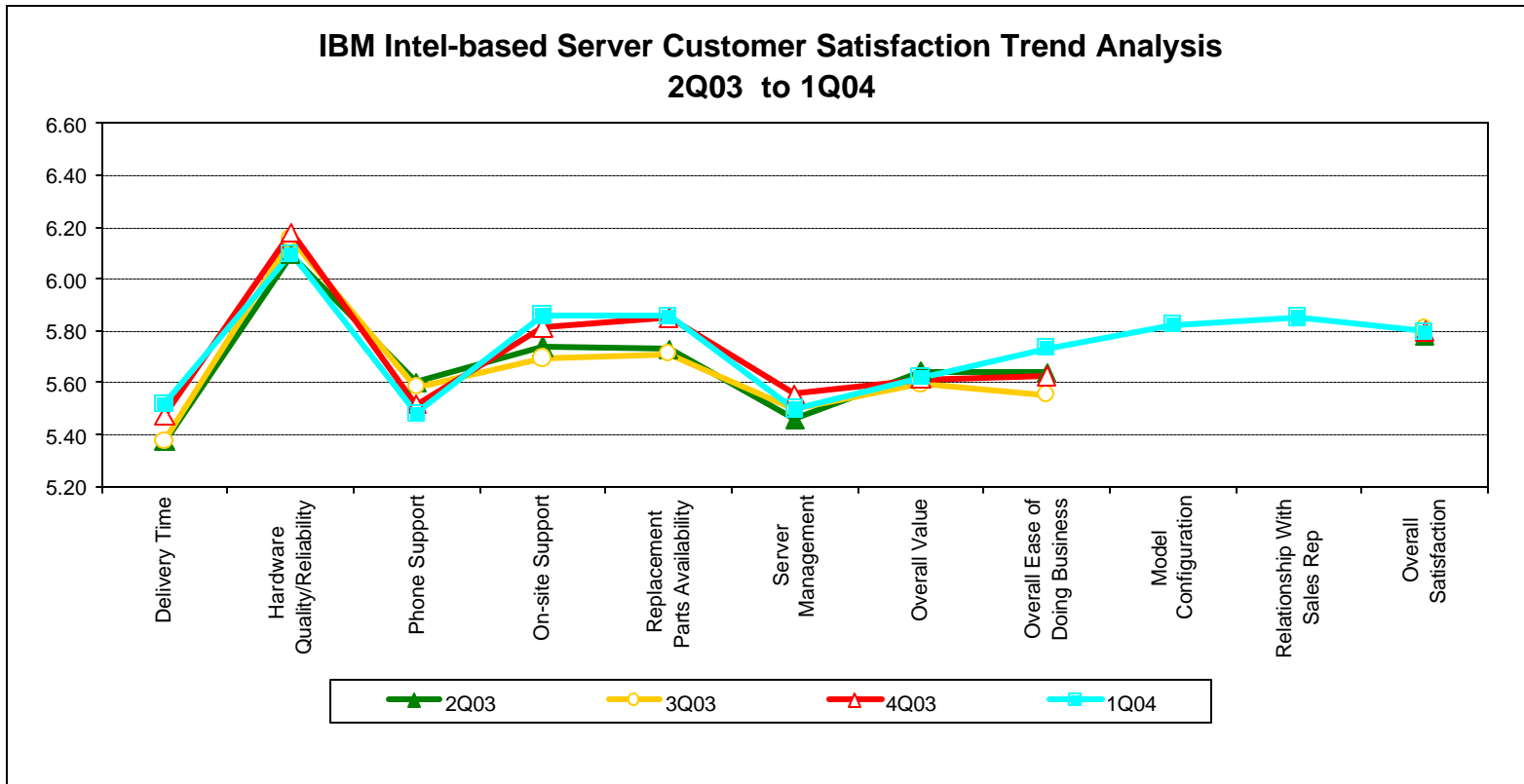
The 2.2% decline in Dell's weighted satisfaction index between 4Q03 and 1Q04 has been driven by declining satisfaction ratings across all of the attribute areas, less so however with regards to server support (both on-site and phone). The most substantial decline during the period has been with regards to server manageability, followed in magnitude by declining satisfaction regarding ease of doing business and overall satisfaction. For the year, all of Dell's 1Q04 satisfaction levels represent the lowest points; it has been a progressive rate of decline.

HP's satisfaction ratings for 4Q03 generally match those of the preceding quarter, thus accounting for the negligible 0.4% change to the upside in its satisfaction index between 4Q03 and 1Q04. The only notable change involves on-site support, where HP's mean satisfaction rating has increased considerably over the levels of the preceding quarter. For the most part, HP's satisfaction ratings have remained at comparable levels throughout the year, particularly with regards to overall satisfaction, ease of doing business, overall value and delivery time where the changes have been unperceivable. Phone support satisfaction, however, was at a higher level at the beginning of the year (2Q03), while the drop in the succeeding quarter has remained consistently at the lower level.

IBM's weighted satisfaction index moved modestly to the upside (+0.5%) between 4Q03 and 1Q04 based on two areas where the ratings have increased, albeit moderately: delivery time and ease of doing business. For the year, IBM's satisfaction ratings for delivery time, on-site support, replacement parts availability and ease of doing business are at their highest levels. Other areas show little overall change, in particular overall value and overall satisfaction, where the ratings have not moved at all for four successive quarters.







Competitive GAP Analyses

The following graph summarizes the relationship between satisfaction and importance for the three Intel-based server vendors and how well each vendor manages customer expectations in the market. The GAP ratings for each vendor are compared against the weighted average GAP rating for all three vendors. This represents the “standard” against which each vendor is compared for any given attribute. The GAP scores are categorized as follows:

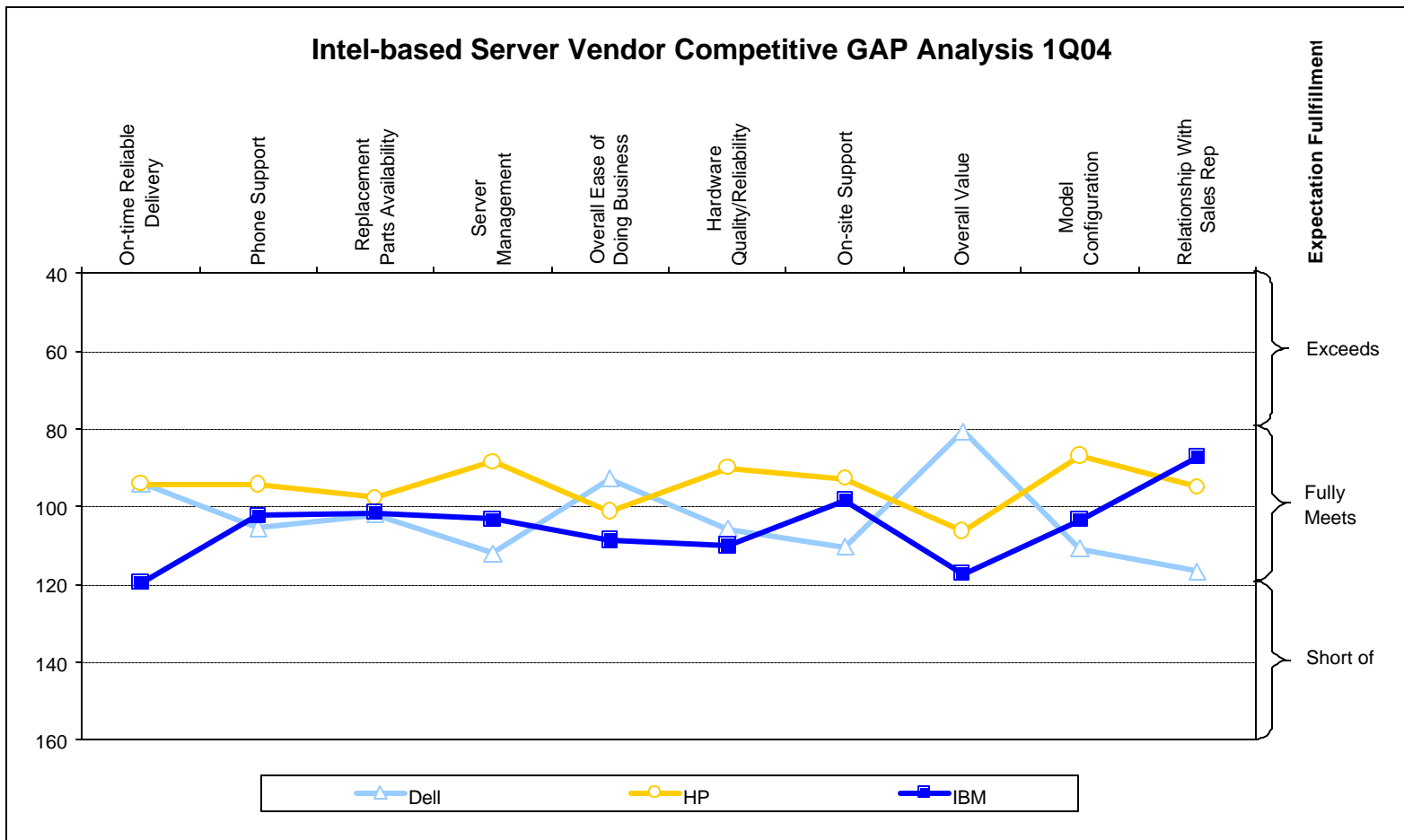
40-80 – Exceeds expectation.

81-120 – Meets expectation.

121-160 – Short of expectation.

Against the standard of meeting Intel-based server customer expectations, Dell has brought in its best performance with regards to overall value, where the vendor has narrowly exceeded the expectations of the marketplace. One area emerges as a potential area of concern for Dell in that the vendor’s GAP rating suggests it has nearly fallen short of marketplace expectations. The new attribute, relationship with sales rep, represents a possible new challenge for Dell, although TBR has included this attribute in the discussion with IT managers only since January 2004. Two additional low points for Dell, though areas where expectations have been basically met, include on-site support and server manageability. HP has performed exceptionally across the list of attributes, with most GAP ratings at the upper end of the 100-point marker, meaning that expectations have been met successfully. HP’s best rating was for model configuration consistency, a new attribute this quarter. HP’s GAP rating for overall value suggests the vendor is meeting marketplace expectations based on the average industry expectations. HP is middle-of-the-road, while Dell and IBM take up the extremes. IBM has met many expectations, with its best performance in the area of relationship with sales rep. Two areas where IBM has been challenged historically continue to point to near failure: delivery time and overall value.

The areas exhibiting the least differentiation in perception by brand include phone support (once problematic for Dell) and replacement parts availability (once a competitive advantage for Dell).



An additional GAP analysis was run to determine how each Intel-based server vendor has managed the expectations of its own customer base. The gap between the satisfaction rating and the importance rating can be one of two types: satisfaction is below what is expected of the customer base or satisfaction exceeds what would realistically be expected from the vendor. The depth, or extremity, of the gap determines how serious the issue might be. One must bear in mind that several of the attributes have such high levels of importance attached to them that even the highest scoring vendors or brands may fall short. For this reason, we consider a score of up to -5% as within the comfort zone. One area where we give more leeway to vendors is with regards to hardware reliability and replacement parts availability. In general, however, the gaps between satisfaction and importance for these attributes are small compared to what we see with the desktop and, in particular, the notebook satisfaction data.

Dell's most immediate challenges include the continued need to improve customer experiences with phone support, as well as a better management in the high-demand area of replacement parts availability. All three vendors are challenged equally with regards to the high demands customers place on them regarding replacement parts delivery. HP continues to need to push on the value proposition, while IBM continues to need to focus on a better delivery mechanism for systems and parts, as well as the value proposition.

GAP Scores by Intel-based Server Vendor
(n = (satisfaction – importance)/satisfaction)

	Dell	HP	IBM
On-time Reliable Delivery	-4.11%	-5.25%	<u>-11.66%</u>
Hardware Quality	-10.32%	-8.18%	-10.97%
On-site Support	0.12%	4.55%	1.16%
Phone Support	<u>-9.07%</u>	-3.80%	-6.05%
Overall Value	-0.96%	-6.46%	<u>-9.63%</u>
Overall Ease of Doing Business	-0.48%	-3.25%	-4.67%
Replacement Parts Availability	-9.35%	-9.92%	-10.10%
Server Management Features/Ease of Management	-2.48%	-2.24%	-1.27%
Model Configuration	0.83%	5.48%	0.55%
Relationship With Sales Rep	3.98%	12.27%	9.20%
Average Gap, All Attributes	-3.98%	-3.23%	-5.85%

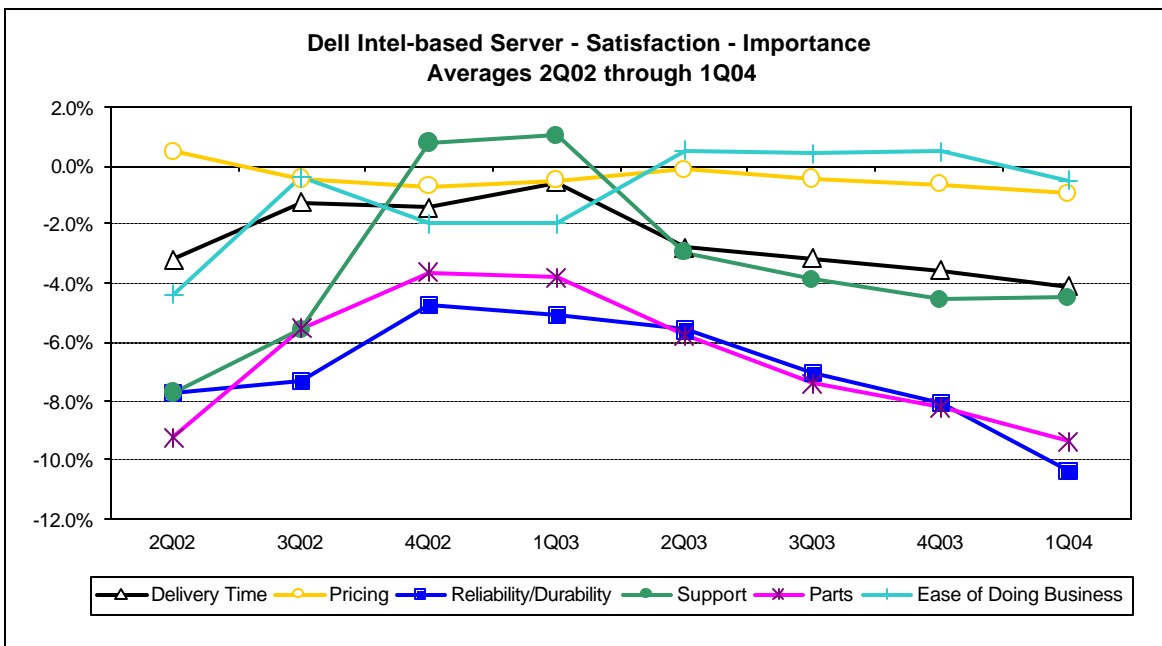
Bold items are attributes where the gap is wide for the vendor; underlined items are attributes where one vendor's gap is particularly wide against its competitors' gaps.

Satisfaction-to-Importance Trends Analyses

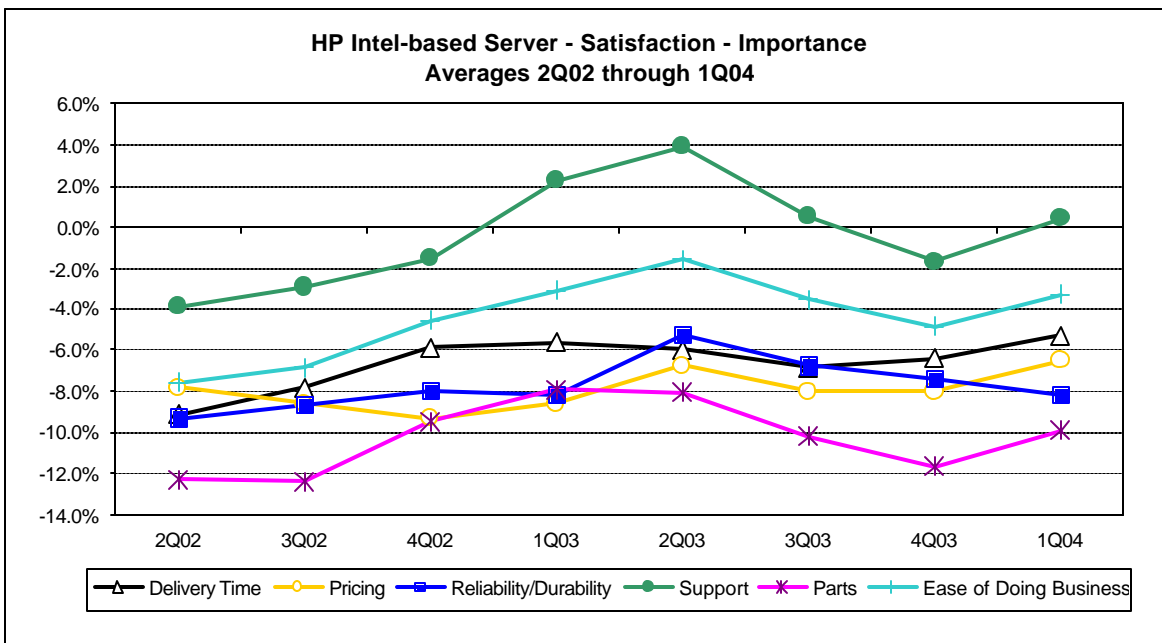
The following groups of analyses consider the trend lines for perhaps the most important aspect of this study: how well the vendors manage the unique expectations of their customers. By measuring these GAP ratings over time, we can better understand which vendors are improving their positions or maintaining their GAP ratings at reasonable levels and thus are more likely to be able to prevent their customers from switching to another vendor. The ideal in these analyses is to maintain a GAP rating at or around the 0% level. Exceeding that level to a great extent over time may waste resources that can better be targeted elsewhere. Repeatedly maintaining GAP levels at a great distance from either the 0% mark or from the competitors' GAP ratings provides a strong warning to vendors that do not address these issues quickly and effectively.

The graphs on the following pages trace the history of the vendors' or brands' GAP ratings back to 1Q02 and plot the changes by major satisfaction category. Dell's strong points are the two areas where the vendor has been able to maintain perfect GAP ratings: overall value and ease of doing business. One cannot expect to perform much better than this. In determining the root cause of Dell's declining satisfaction indices, it appears largely to have been the result of considerably widening gaps between customer expectation and satisfaction regarding hardware quality and replacement parts availability. In both cases, it is important to remember that customer demands for both of these attributes are inordinately high and difficult for any vendor to manage. Both attributes' GAP ratings are outside of the traditional comfort zone in this analysis, yet again, the expectations have been inflated. At a secondary level, gaps between expectation and satisfaction regarding delivery time and product support have also been increasing. TBR believes these findings are not realistically the sign of a vendor in decline, but rather of shifting customer expectations and the criticality with which these customers perceive Dell. TBR asserts this is a combination of

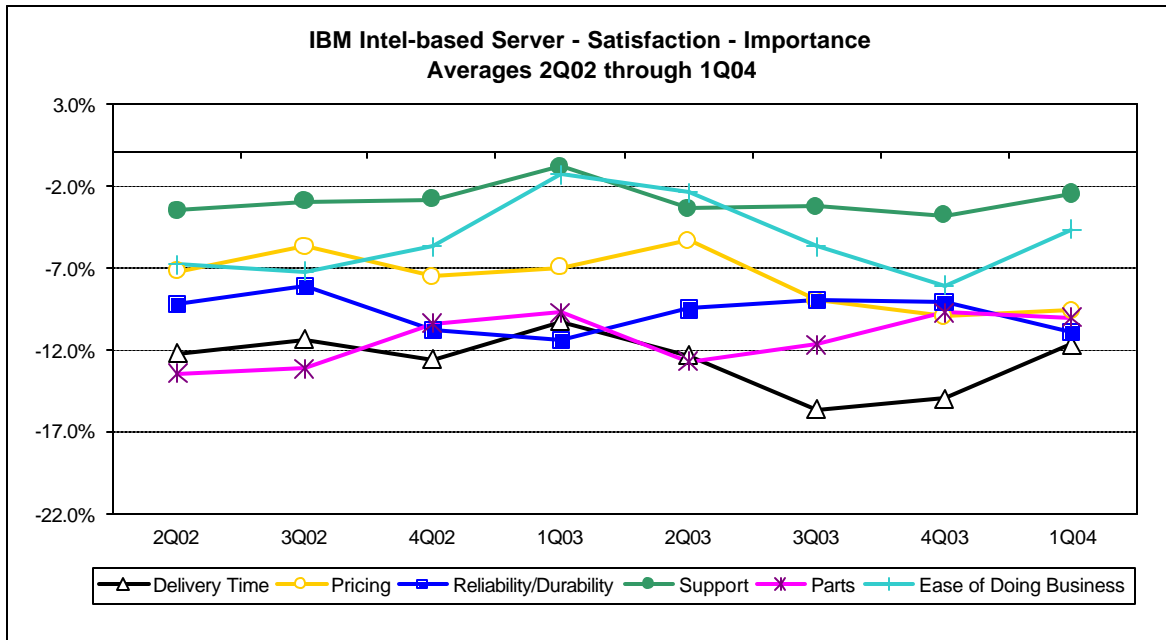
influxes of new customers with high expectations for their new vendor and the perception that Dell should be performing better based on their well-known market share gains.



HP has been maintaining and/or gradually improving its abilities to meet customer expectations with the exception of hardware quality, a condition of the industry and not specific to any one vendor. The current quarter's results represent a moderate progression over previous GAP positions. Unlike Dell, however, HP is experiencing gaps outside of the comfort zone in all areas except support and ease of doing business. The fact that this condition exists suggests HP needs to do considerable work in order to maintain and/or strengthen its position in this study. TBR believes HP needs to focus on improving its value GAP position.



Again, with the exception of hardware quality, where the industry appears to be expecting more, IBM has maintained or improved its ability to meet customer expectations across the satisfaction attributes. Most notably, there have been improvements in 1Q04 with regards to IBM's ability to meet customers' expectations for both ease of doing business and delivery time. Like HP, only server support and ease of doing business represent areas where expectations have been adequately met. IBM most clearly needs to improve its position relative to the perception of value and delivery time.



Additional Intel-based Server Issues

As expected, IBM customer sites reported the largest installed base of Intel-based servers, a typical finding in that IBM tends to serve larger corporations than HP and, in particular, Dell. Companies plan to purchase an average of approximately 100 Intel-based servers during the next 12 months.

Intel-based Server Quantities and Types

	Average Number of Intel-based Servers Installed	Average Number of Intel-based Servers to be Purchased During Next 12 months
Dell	404	118
HP	410	92
IBM	526	114

APPENDIX B: STUDY BACKGROUND

1Q04 SAMPLE OVERVIEW

TBR's *1Q04 Corporate IT Buying Behavior & Customer Satisfaction Study: Intel-based Servers* is based on interviews with qualified respondents at 617 large U.S. and Canadian establishments, primarily MIS/IT, systems management and purchasing managers. A number of the respondents are responsible for purchasing multiple brands for their company or site and thus were interviewed twice (once for each brand). Consequently, 715 interviews were completed for the reporting period. The Intel-based server segment interviews for the reporting period were distributed as follows: 306 Hewlett-Packard customer interviews, 243 Dell customer interviews and 166 IBM customer interviews. Interviews were conducted between Oct. 1, 2003, and March 31, 2004.

ON PERCEPTION AS THE KEY TO CUSTOMER SATISFACTION

This analysis is based on the timely collection of opinions and perceptions of large corporate end users relaying PC product and service experiences that they are aware of within their organization or division. The customer "perception," defined by Merriam-Webster as a "quick, acute and intuitive cognition," represents an immediate impression of the customer's state of well being with their vendor. A perception may be influenced by facts, but the overall impression, that which the respondent communicates to us at TBR, is influenced by a multitude of factors, some concrete (e.g., DOA rates), some abstract (e.g., encounters with account or sales representatives), some based on recent occurrences and some on lingering impressions (e.g., negative critical incidents having occurred in the past that the customer continues to associate with the vendor or brand). It is not TBR's intent with any of the attributes we measure to benchmark product reliability or performance metrics, collect and analyze service call tickets, collect logs regarding actual, recorded DOA rates, compare price/performance metrics, evaluate the complexities and costs related to a new system set-up, measure the results of internal total cost of ownership analyses or collect specifics on actual discounts received by customers. The intention of the analysis is to reflect, as much as is possible in quantification, the total experience of the corporate end user, including attributes related specifically to the product, as well as the delivery mechanism, service and support offerings and pricing of the products. It is these customer perceptions that drive customer satisfaction initially and customer loyalty ultimately.

It is also important to note respondents are not asked to draw comparisons between vendors or brands. When respondents rate their vendor, they are rating them in isolation of other brands and based on their own requirements. While some respondents do rate two brands when we encounter multivendor sites, they complete two separate interviews. The cross-brand comparisons in this report have been drawn by TBR.

Natural fluctuations in opinions cannot be avoided either within a respondent group (e.g., customers of each specific vendor) or from the results of one reporting period to the next. It is the purpose of this analysis to weed out the variability attributed to chance alone from variability based on actual, recorded opinions. Differences across the vendors in terms of satisfaction are cited only when the differences can be quantified as real and not due to chance. While it may appear that changes in opinion from one reporting period to the next can be somewhat abrupt, the reasons for them are generally clear and form a definitive pattern distinct to the vendor being measured. Some of the attributes TBR measures also tend to be unstable or fluctuating, such as all areas of support, delivery times and volume discounting. The use of panel members does not skew the results because these respondents do not necessarily alternate across reporting periods (their participation depends on their availability) and the panel list represents approximately 20% of any given sample while the remaining 80% is composed of fresh contacts.

The overall intent of this project is to measure cumulative customer satisfaction based on repeat encounters between customers and vendors and the impressions these encounters create. The repetition of the basic methodology during calendar quarters forms the basis for tracking change over time. There are factors, however, at work behind the scenes that are not as readily quantifiable but deserve mention. These influences are what are known in the customer satisfaction field as "critical incidents," or encounters that go beyond the expected in either the negative or positive sense. An example of a positive critical incident would be an unexpected behavior on the part of the vendor, such as a make-good for an unfortunate incident or a customer service offer that goes beyond what any reasonable customer would expect. The impact of such an incident is that it can create a sense of well being that may permeate all aspects of the customer experience, causing the customer to rate their vendor on perhaps a higher plane than they would under normal circumstances. The impact of a positive critical incident can also create a customer that may be more willing than the average customer to endure various shortcomings on the part of the vendor.

A negative critical incident is perhaps more powerful in terms of the lingering effect. An example of a negative critical incident would be a large delivery of DOAs, or a reliability issue involving mission-critical servers where the downtime caused an interruption in revenue generation. These types of experiences with a vendor, whether by virtue of the depth of the negative encounter or the frequency of the negative encounters, can have a negative impact on satisfaction ratings for a particular vendor over a considerable period of time before the customer is willing or able to forget the past.

The critical incident phenomenon is perhaps as powerful as it is because it involves the emotions of the customer in an intensity that “business as usual” can never approach. The fact that these issues are at play behind the cumulative metrics that TBR collects needs to be recognized since they have a major impact on both the speed and the tardiness of the changes noted in the study over time.

CUSTOMER SATISFACTION STUDY DESIGN

The *1Q04 Corporate IT Buying Behavior & Customer Satisfaction Study: Intel-based Servers* report follows the established procedure for TBR’s customer satisfaction studies, covering attribute areas in four general categories: 1) delivery time and product availability; 2) hardware (including quality/reliability and model configuration consistency); 3) value; 4) software (server management capabilities); and 5) services and support (including phone support, on-site support, replacement parts availability, relationship with sales rep and ease of doing business). Respondents were asked to evaluate their vendor for the list of attributes above and were asked to provide commentary on their vendors’ specific successes and failures. At the conclusion of the list of attributes, respondents were also directly asked to rate their vendor for overall satisfaction.

Customer satisfaction measures respondents’ satisfaction with the vendors from which they purchased products and services during the most recent buying cycle. They rate a series of product and vendor attributes on a 7-point Likert scale grading system. The customer satisfaction analysis considers scores on two planes: 1) each vendor against the competition (the sum of each vendor’s competitors) and 2) each vendor against the expectations of its customer base via an analysis measuring the gap between attribute importance and customer satisfaction. The study also compares loyalty ratings for the vendors from which respondents most recently purchased products and services and scores them on a numeric scale, with a low of 1 and a high of 5. Loyalty is also measured by looking at the proportion of companies that replaced a major vendor during the past 12 months with a competing vendor.

The goal of the customer satisfaction analysis is to rank the vendors from most to least satisfactory through a combination of analytical techniques. These are described in “Appendix C: Customer Satisfaction Ratings: Procedural Description.”

METHODOLOGY AND SAMPLE

The list for the customer satisfaction research program is derived from TBR’s in-house database of companies that match qualifying companies from the following sources:

- *InformationWeek* 500 “biggest and best corporate users of information technology.”
- *Forbes* 500 list of public companies.
- *Forbes* 500 list of private companies.
- *Fortune* 500.
- *BusinessWeek* 1,000 list of largest public companies.
- *CIO* 100.
- *Computerworld* Premier 100.
- Directory of Top Computer Executives (Applied Computer Research).
- Additional TBR contacts from internal research projects.

The list includes respondents from previous reporting periods who have agreed to become members of TBR’s customer satisfaction panel during alternating reporting periods. This reporting period’s study includes no more than 20% of respondents who served as panel members in previous reporting periods. Panel members agree to respond to the survey every other reporting period and also receive copies of the “Executive Summary.” The inclusion of these panel members as 15% to 20% of any given sample lends stability to the data from which TBR analyzes quarterly changes.

Respondents selected for the sample are screened to ensure they are responsible for buying decisions for Intel-based servers. A mix of respondents is responsible for buying decisions at the corporate level or for a division. Respondents are further qualified to include those that will purchase a minimum of 100 desktops, notebooks and Intel-based servers during the next 12 months.

The sample size for this reporting period's study included 715 contact interviews from 617 large corporate establishments in the United States and Canada. The sample selection methodology is random within a quota structure that dictates the minimum and maximum number of interviews acceptable for each principal vendor. The rules currently applied to the sampling procedure restrict the minimum sample size to 50. A maximum sample size rule has also been implemented. The interviewing for this study took place from October 2003 through March 2004.

The sample for 1Q04 represented a standard error of less than 2% on average at the 95% confidence interval. The table below summarizes the sample sizes and standard error measurements for each of the major vendors. Standard error measurements are influenced both by the sample size and the level of consensus (or non-consensus) within the group.

**95% Confidence Level per Segment
 Average Measurements Across All Attributes**

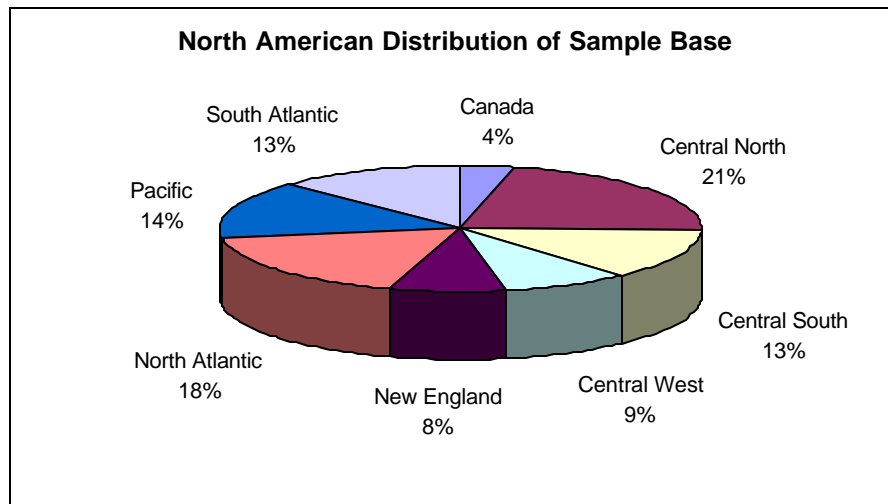
	Intel-based Servers	
	Sample Size	CI Interval Around the Mean (+/-)
All Vendors	715	2.0%
Dell	243	2.9%
HP	306	2.4%
IBM	166	3.2%

The sample of 617 large U.S. and Canadian corporations represented a reasonable cross section of the population, as detailed in the table below. Every effort is made to maintain consistency of industry classification from one reporting period to the next.

Types of Businesses Represented in the Study

Type of Business	Percentage of Respondents
Agriculture/Mining/Construction	2.3%
Discrete Manufacturing	13.8%
Education	7.0%
Finance/Insurance/Real Estate	15.6%
Government	3.7%
Healthcare	10.7%
Hospitality	1.8%
Information Services	4.9%
Other Services	9.9%
Petrochemical	5.3%
Process Manufacturing	5.7%
Professional/Tech/Scientific	7.1%
Public Utilities	4.1%
Retail/Wholesale	5.0%
Transport	3.2%

The geographic distribution of the sample base is shown below.



The average corporation represented in the sample employs approximately 10,000 people.

Average Number of Employees at the Companies Surveyed

Number of Employees	Percentage of Respondents
<500	2.8%
500-1,000	18.5%
1,000-4,999	38.1%
5,000-9,999	16.5%
10,000-14,999	6.5%
15,000-19,999	3.4%
20,000-49,999	9.4%
50,000-74,999	1.9%
75,000-99,999	0.8%
100,000+	1.1%
Don't Know, Refused	1.0%
Average Number of Employees	10,093

The majority of the respondents are MIS managers, directors or senior executives.

Respondent Job Functions/Responsibilities

Level	MIS/IT	Networking	Systems Management	Purchasing	Customer Service/Support	Other*	Grand Total
Vice President	14.42%	0.32%	0.32%	0.49%	0.16%	0.16%	15.88%
Director	31.60%	3.40%	3.57%	2.59%	1.62%	1.94%	44.73%
Manager	20.10%	4.38%	2.43%	2.11%	1.62%	0.49%	31.12%
Supervisor/Coordinator	7.62%	0.00%	0.16%	0.49%	0.00%	0.00%	8.27%
Grand Total	73.74%	8.10%	6.48%	5.67%	3.40%	2.59%	100.00%

*Computer operations, technical support, infrastructure, help desk, finance, R&D, etc.

The sample for the 1Q04 study represented a total installed base of approximately 3 million systems and a planned acquisition volume of approximately 685,000 systems for the next 12 months.

The table below summarizes the PC environments of the sampled corporations in terms of installed base and purchase intent.

Units Installed and Planned for Purchase by Form Factor

	Installed Base			Purchase Intent		
	Desktops	Intel-based Servers	Notebooks	Desktops	Intel-based Servers	Notebooks
Enterprise						
Sum	1,795,722	204,786	461,723	418,543	41,283	108,076
Mean	4,401	501	1,132	1,044	105	272
Division						
Sum	363,879	20,233	118,215	51,217	3,473	12,711
Mean	1,915	106	625	280	19	70
Percent of Installed Base Replaced						
Enterprise	23.3%	20.2%	23.4%			
Division	14.1%	17.2%	10.8%			

APPENDIX C: CUSTOMER SATISFACTION RATINGS: PROCEDURAL DESCRIPTION

ANALYTICAL MODEL

The customer satisfaction analysis was based on several lines of questioning. Respondents were asked to grade their vendor across a series of attributes (listed below) for each brand the surveyed corporations purchased in the most recent buying cycle. At the conclusion of the attribute testing, respondents were asked to provide a rating based on a 7-point Likert scale.

Totally Dissatisfied (Failure)			Mediocre			Totally Satisfied
Failure	Very Poor	Poor	Fair	Good	Very Good	Excellent
1	2	3	4	5	6	7

Respondents were also asked to indicate the relative importance of each of the attributes in choosing their brand. These responses were given on a 1- to 5-point scale, with 1 meaning not at all important and 5 meaning very important. These ratings determined the gap between vendor satisfaction and importance, or how well the vendor manages expectations.

Respondent were then asked to indicate on a 1- to 5-point scale the degree of their loyalty toward their primary vendor(s). Finally, respondents were asked whether their corporation switched from one vendor to another during the past 12 months, and if so, which vendors were involved and why a change was made. The measured attributes for Intel-based servers are shown below.

Measured Attributes for Intel-based Server Segment

- On-time Reliable Delivery
- Hardware Quality
- On-site Support
- Phone Support
- Overall Value
- Overall Ease of Doing Business
- Replacement Parts Availability
- Server Management Features/Ease of Management
- Model Configuration
- Relationship With Sales Rep
- Overall Satisfaction

TBR’s overall vendor rankings were determined through an exhaustive series of analyses that must be evaluated one against the other. These analytical techniques included:

1. A table of satisfaction statistics (including mean, standard deviation, standard error, range around the mean representing 95% confidence interval and standard t-test) describes customer satisfaction for each vendor in each attribute area, with special emphasis on overall satisfaction. A series of t-tests was performed on each vendor against the sum of its competitors, and the attribute areas where significant differences in score were indicated are marked. The t-test is a significance test that compares two means in order to determine if one mean is significantly different than the other, taking variability of response into consideration. The purpose of these tests is to determine if any of the group’s mean differences observed (e.g., a group being a set of customers of one vendor) cannot be entirely explained by random or natural variation within sampled groups of customers. In other words, the observed differences are real. TBR uses an independent sample t-test assuming unequal variances, or the standard student’s t-test. Those attributes with an α level of 0.05 or less are cited as indicating there is a 95% chance that concluding the two means are different is correct. A t-test of the grand

mean (the mean of all scores for all attributes combined) serves to determine whether any of the vendors' scores overall tend to run higher or lower than the competitors' scores.

As a backup to the above tests, an alternate test is used for confirmation purposes (e.g., one-way analysis of variation). The variation within a group of customers is first determined in these one-way ANOVA tests. These variations are then compared to the variability between the groups (e.g., between the Dell, HP and IBM customers). The between group variation is measured by the sum of the squared differences between the sample mean of each group and the grand mean, which is then weighted by the sample size in each group. The between group variation will be larger than the within group variation (variation within each specific customer group) if there are meaningful differences between the means. The attributes that pass this additional test are also cited in the report. While the one-way ANOVA identifies which attributes are affected by differing means according to customer group, further tests such as the bonferroni identify exactly which means differ from one another.

2. The competitive GAP analysis measures the gap between a vendor's customer satisfaction for each attribute area against the expectations (importance ratings) of the market (all respondents). The standard against which each vendor is measured is the average size of that gap for all notebook vendors. The GAP analysis compares vendor satisfaction per attribute against importance per attribute among the vendor's customer base relative to overall satisfaction for all vendors per attribute against overall importance for all vendors per attribute. The formula for each attribute area independently is as follows:

$$GAP = \frac{(Vendor\ Importance * (12 - Vendor\ Satisfaction))}{(Grand\ Mean\ Importance * (12 - Grand\ Mean\ Satisfaction))} * 100$$

The product for the above is graphed on a scale where values between 40 and 80 are areas where the vendor exceeds customer expectation; values between 81 and 120 are where the vendor fully meets expectation; and values greater than 120 are where the vendor falls short of expectation.

3. A second GAP analysis considers how each systems vendor manages the expectations of its own customer base. For each vendor independently and for each attribute area, the mean satisfaction rating is graphed next to the mean importance rating (adjusted from a 5-point scale to the 12-point scale used for customer satisfaction). There are three possible outcomes: satisfaction meets customer expectation (bar graphs are equal or within a range where the gap is not significant); satisfaction falls short of expectation (indicating areas where the systems vendor may want to consider focusing greater efforts on raising satisfaction); and satisfaction exceeds expectation (indicating attribute areas where the systems vendor may be focusing more than is necessary).
4. Yet another GAP analysis is focused on determining the areas where the vendors need to set up improvement programs and areas where they may be able to pull back resources. It uses a similar formula to the competitive GAP analysis; however, the denominator becomes the grand mean importance and satisfaction for the vendor across all of the attributes. In this test, TBR compares the gaps for each of the individual attributes against the average gap for the vendor. Areas where the gaps measure wider than the average are areas where the vendor most urgently needs to focus its improvement efforts.
5. A trend analysis compares each vendor's customer satisfaction scores for the current reporting period separately against those from both the preceding reporting period and the reporting period prior to that. By comparing against both reporting periods, TBR is able to determine if any changes are indicative of a real change in historical pattern. This graph uses a 95% confidence-interval technique; the scores for each vendor are represented with the mean indicated in the middle from which the lines extend in both directions the distance of the standard error around the mean. This analysis is used to determine the reasons a vendor may move up or down in the rankings from previous reporting periods. Is it because the vendor improved or because the competition declined in customer satisfaction? The analysis also is used to pinpoint potential problem areas or areas where marked improvement is evident.
6. A multiple regression analysis is run for each form factor and for each vendor in order to determine the principal drivers of overall satisfaction. Each of the attributes is specified as independent variables and measured against the dependent variable: overall satisfaction. The attributes selected are the best predictors for overall satisfaction. The analysis uses a stepwise multiple regression with missing values handled in one of two ways: the missing values are replaced by the mean or pair-wise comparisons are made. TBR advises the reader to consider the results of this analysis with a measured amount of caution because many of the attributes are highly correlated with one another and can be as highly correlated with one another as they may be with the overall satisfaction attribute. The smaller sample sizes encountered when broken down by vendor also detract from the reliability of the results.

7. Loyalty ratings are provided by the respondents for their primary vendor(s) on a scale from 1 to 5, where 1 means little to no loyalty and 5 means solid loyalty. The means for each vendor are represented against one another and against the grand mean. The loyalty ratings are becoming less reliable indicators of true customer satisfaction because strong levels of loyalty are often established higher up within an organization as corporation mandates. They are not necessarily related to customer satisfaction as feedback from the actual users within the organization.
8. Levels of vendor loyalty are confirmed by determining from the respondents whether they have switched from one vendor to another during the past 12 months. In addition to determining the proportion of companies that have switched brands, the study determines which brands were involved and the principal reasons for the switch.
9. A numeric weighting model is applied in order to provide a ranking of the vendors and a means for tracking overall change in customer perception over time. Where N represents the total number of attributes, AI the importance score for each attribute and AS the satisfaction score for each attribute, the formula applied for calculating the weighted satisfaction index, on an individual respondent basis is:

$$\text{Weighted Satisfaction Index} = \left(\frac{\sum_{i=1}^N AS_i AI_i}{\sum_{i=1}^N AI_i} \right) / 12 * 100$$

Where N = total number of attributes; AS = the satisfaction score for each attribute and AI the importance score for each attribute.

Note: Importance ratings for overall satisfaction and customer loyalty have been standardized at a value of 5. The total number of attributes for the desktop segment = 14 (including overall satisfaction and customer loyalty); for the Intel-based server segment = 16; for the notebook segment = 16; for the service & support segment = 8.

The above has been calculated for each respondent, with missing values (Don't Know or Not Applicable responses) having been replaced with the mean value for the attribute for the vendor group. The weighted satisfaction index for each vendor is the mean of the respondents' weighted scores. The calculation for the individual satisfaction index is as follows.

Where S = the sum of the satisfaction rating times the corresponding importance rating across the total attributes; and where I = the sum of the importance ratings across the attributes:

$$\text{Weighted Satisfaction Index} = \frac{\left(\frac{S}{I} \right)}{12 * 100}$$

10. A vendor strength and weakness table is the final result of all the above analyses. The table points to the attribute areas that are definite strengths or weaknesses for each vendor. Areas of neutrality are those attributes where the vendor's customer satisfaction performance is about average. The formula utilized for the determinations is: each attribute receives a score of 0 for neutrality, +1 for a positive and -1 for a negative. Three analyses are reviewed: the t-test analysis (0 for null, +1 for significantly higher scores and -1 for significantly lower scores); the competitive GAP analysis (0 for meeting expectation, +1 for exceeding and -1 for falling short); and the vendor GAP analysis (same as above). The three scores for each attribute are summed up. Any attribute with a total score of +2 or -2 is cited as a strength or weakness; total scores between these ranges are cited as neutral areas. Those with scores of +3 or -3 are areas of particularly strong strength or weakness.

APPENDIX D: SURVEY INSTRUMENT

CBQ Supporting Customer Satisfaction Survey (1Q04)

Name: _____	Title: _____	Survey #	
Company: _____		Date	
Division: _____		Interview #	
Address: _____		Proofed	
City: _____	State: _____	Zip: _____	Keyed
Telephone: _____	Ext. _____		
E-mail: _____ @ _____	Report Request: _____		

- A) COLD CALL: Hello, my name is _____ and I'm calling from Technology Business Research. We currently conduct an independent analysis of customer satisfaction with the leading vendors of computer products and services. The results are published in reports used by end-users like you to assist in making important decisions in terms of future vendor selections. The results are also utilized by vendors to measure their satisfaction performance, and to make product and service changes to better address their customers' needs. If you would like we can send you an executive summary of the report at no charge for participation in the survey.
- B) B) REPEAT RESPONDENT: Hello, my name is _____ and I'm calling from Technology Business Research. We last spoke with you _____ and would like to update your opinions regarding your computer product and service experiences. As you know, the results are published in reports used by end-users like you to assist in making important decisions in terms of future vendor selections. The results are also utilized by vendors to measure their satisfaction performance, and to make product and service changes to better address their customers' needs. If you would like we can send you an executive summary of the report at no charge for participation in the survey.

II. Intel-based Server Satisfaction

Screener

Are you personally involved in evaluating or recommending Intel-based Servers for your organization?

YES NO Get referral and proceed to section III (Notebook section)

Which of these statements best describe how you, personally, are involved in Intel-based server buying decisions at your company? (check ALL that apply)

- One of principal final decision makers, corporate level [] 1
Part of team/committee making recommendations to corporate [] 2

Please list all brands of Intel-based servers purchased by your company over the past 12 months and what are the approximate proportions of annual purchases?

_____	_____ %
_____	_____ %
_____	_____ %

TOTAL MUST ADD UP TO 100%.
SELECT THE LEAST POPULAR BRAND WHENEVER POSSIBLE (IBM) AND ASK THEM TO RATE THE VENDOR BELOW.

For your Intel-based server vendor (vendor being rated), can you specify the approximate number of units purchased within the past 12 months?

VENDOR BEING RATED	# UNITS PURCHASED PAST YEAR
Dell []1	_____
HP []2	_____
IBM []3	_____

In the past year, approximately what percentage of your (brand rated) servers were base on the following architectures: (Total must equal 100%)

Celeron	_____	%
Pentium	_____	%
XEON-32	_____	%
Opteron	_____	%
Itanium	_____	%
Other, Specify	_____	%

What percent of your (brand rated) servers are running on the following operating systems?

Windows 2000	_____	%
Windows 2003	_____	%
Windows NT	_____	%
Windows XP	_____	%
Linux	_____	%
Netware (Novell)	_____	%
Other Specify	_____	%

What are your general levels of satisfaction for your (vendor being rated) servers for each of the following attributes?

This is a 1-7 point scale with the following points, where 1 means totally dissatisfied (complete failure on the part of the vendor), 2 is “very poor”, 3 is “poor”, 4 means average/acceptable or fair, 5 means “good”, 6 means “very good” and 7 means totally satisfied or excellent. Please feel free to answer “Don’t Know” for areas where you are not sufficiently involved and “Not Applicable” for services you do not receive or use or if you have not been buying or using the products for a sufficient period of time.

Overall hardware quality combining out-of-box quality and hardware reliability?

Failure	Very Poor	Poor	Fair	Good	Very Good	Excellent	Don’t Know	Not Applicable
1	2	3	4	5	6	7	DK	NA

Overall value, including price paid plus short and long-term costs?

Failure	Very Poor	Poor	Fair	Good	Very Good	Excellent	Don’t Know	Not Applicable
1	2	3	4	5	6	7	DK	NA

Ease of doing business with vendor?

Failure	Very Poor	Poor	Fair	Good	Very Good	Excellent	Don't Know	Not Applicable
1	2	3	4	5	6	7	DK	NA

Product delivery time/availability?

Failure	Very Poor	Poor	Fair	Good	Very Good	Excellent	Don't Know	Not Applicable
1	2	3	4	5	6	7	DK	NA

Replacement parts availability?

Failure	Very Poor	Poor	Fair	Good	Very Good	Excellent	Don't Know	Not Applicable
1	2	3	4	5	6	7	DK	NA

Phone support?

Failure	Very Poor	Poor	Fair	Good	Very Good	Excellent	Don't Know	Not Applicable
1	2	3	4	5	6	7	DK	NA

You indicated a rating of X phone support. How long does it typically take to resolve a support issue with your vendor over the phone?

_____ Please indicate minutes, hours, days, etc.

On-site support including on-site support response and expertise?

Failure	Very Poor	Poor	Fair	Good	Very Good	Excellent	Don't Know	Not Applicable
1	2	3	4	5	6	7	DK	NA

You indicated a rating of X for on-site support. How long does it typically take to resolve a support issues with your vendor on site?

_____ Please indicate minutes, hours, days, etc.

Model configuration consistency ?

Failure	Very Poor	Poor	Fair	Good	Very Good	Excellent	Don't Know	Not Applicable
1	2	3	4	5	6	7	DK	NA

Relationship with sales rep ?

Failure	Very Poor	Poor	Fair	Good	Very Good	Excellent	Don't Know	Not Applicable
1	2	3	4	5	6	7	DK	NA

Server management tools?

Failure	Very Poor	Poor	Fair	Good	Very Good	Excellent	Don't Know	Not Applicable
1	2	3	4	5	6	7	DK	NA

OVERALL satisfaction?

Failure	Very Poor	Poor	Fair	Good	Very Good	Excellent	Don't Know	Not Applicable
1	2	3	4	5	6	7	DK	NA

On a scale of 1 to 5, how solid is your loyalty to your (vendor being rated) servers, with 1 being the least loyal and 5 being the most loyal?

Least Most
 1 2 3 4 5

We'd like to understand how important each of the attributes was in contributing towards your overall satisfaction. Using a 5-point scale, where 1 means not at all important and 5 means extremely important, please rate each of the attributes according to how they influence your brand selection.

	Not Important		Average Importance		Extremely Important
Hardware reliability/quality	1	2	3	4	5
Overall value	1	2	3	4	5
Ease of doing business with vendor	1	2	3	4	5
Delivery time/product availability	1	2	3	4	5
Replacement parts availability	1	2	3	4	5
Phone support	1	2	3	4	5
On-site support	1	2	3	4	5
Model configuration consistency	1	2	3	4	5
Relationship with sales rep	1	2	3	4	5
Server management tools	1	2	3	4	5

In the past 12 months, has your company switched (either temporarily or permanently) from one Intel-based server vendor to another?

YES NO

Switched from _____ to _____

What was the reason for switching? _____

If the respondent switched vendors, record above and check off up to three reason why in the table below.

- | | |
|---------------------------|-----------------------------|
| 1 [] Pricing/Costs | 8 [] User preferences |
| 2 [] Corporate Mandate | 9 [] Standardization |
| 3 [] Reliability/Quality | 10 [] Performance/features |

- | | | | |
|-------|--------------------------|--------|--------------------------------|
| 4 [] | Support | 11 [] | Project -driven |
| 5 [] | Availability/Delivery | 12 [] | Replacement parts availability |
| 6 [] | Relationship with vendor | 13 [] | Trial/test |
| 7 [] | Hardware design | 14 [] | Other _____ |

If **price** were not an issue or consideration, what brand of servers would you purchase?

Brand _____

VII. Overview: Demographics and Topology

Which of the following best describe the **primary business** of your company? (Check one box only)

<input type="checkbox"/>	201	Agriculture, Forestry, Fishing and Hunting
<input type="checkbox"/>	202	Mining
<input type="checkbox"/>	203	Utilities
<input type="checkbox"/>	204	Construction
<input type="checkbox"/>	205	Manufacturing: Food, Beverage, Textile and Apparel
<input type="checkbox"/>	206	Manufacturing: Wood, Paper and Nonmetallic Mineral
<input type="checkbox"/>	207	Manufacturing: Coal, Petroleum, Chemicals and Plastics
<input type="checkbox"/>	208	Manufacturing: Metal, Machinery, Transportation and Furniture
<input type="checkbox"/>	209	Manufacturing: Electronics and Computers
<input type="checkbox"/>	210	Wholesale Trade
<input type="checkbox"/>	211	Retail Trade: Essentials
<input type="checkbox"/>	212	Retail Trade: Non -essentials
<input type="checkbox"/>	213	Transportation: Air, Rail, Water and Truck
<input type="checkbox"/>	214	Transportation and Warehousing, Postal, Couriers and Warehousing
<input type="checkbox"/>	215	Information
<input type="checkbox"/>	216	Finance and Insurance
<input type="checkbox"/>	217	Real Estate, Rental and Leasing
<input type="checkbox"/>	218	Professional, Scientific and Tech
<input type="checkbox"/>	219	Management of Companies and Enterprises
<input type="checkbox"/>	220	Administrative and Support, Waste Management and Remediation
<input type="checkbox"/>	221	Educational Services and Assistance
<input type="checkbox"/>	222	Healthcare and Social
<input type="checkbox"/>	223	Arts, Entertainment and Recreation
<input type="checkbox"/>	224	Accommodation and Food Services
<input type="checkbox"/>	225	Other Services
<input type="checkbox"/>	226	Public Administration

How many employees are in your organization? (Check one box only)

- 1 <500
- 2 500-999
- 3 1000 to 4999
- 4 5000 to 9999
- 5 10000 to 14999
- 6 15000 to 19999
- 7 20000 to 49999
- 8 50000 to 74999
- 9 75000 to 99999
- 10 Greater than 100000
- 11 Don't Know
- 12 Refused

Your job function can best be described as...(Read list, check one only)

- 1 Purchasing Department
- 2 MIS or IT
- 3 Systems Management
- 4 Networking
- 5 Customer Service/Support
- 6 Other Describe_____

Your job level can best be described as ...(Read list, check one only)

- 1 Vice President
- 2 Director
- 3 Manager
- 4 Other Describe_____

APPENDIX E: INTEL-BASED SERVER CUSTOMER SATISFACTION SCORES: 1Q02 THROUGH 1Q04

	1Q02	2Q02	3Q02	4Q02	1Q03	2Q03	3Q03	4Q03	1Q04
On-time Reliable Delivery									
Dell	5.88	5.94	5.99	6.07	6.07	5.94	5.96	5.92	5.81
HP	5.78	5.71	5.74	5.88	5.86	5.80	5.80	5.82	5.83
IBM	5.34	5.47	5.54	5.41	5.38	5.37	5.38	5.47	5.52
Hardware Quality									
Dell	6.25	6.22	6.21	6.22	6.25	6.35	6.27	6.19	6.13
HP	6.15	6.07	6.07	6.16	6.21	6.35	6.28	6.26	6.26
IBM	6.08	6.08	6.08	5.96	5.96	6.09	6.15	6.18	6.10
On-site Support									
Dell	5.47	5.45	5.54	5.69	5.77	5.84	5.74	5.69	5.69
HP	5.50	5.49	5.59	5.72	5.82	5.85	5.73	5.76	5.89
IBM	5.50	5.66	5.73	5.77	5.91	5.74	5.69	5.81	5.86
Technical Support Response									
Dell	5.44	5.37	5.47	5.68	5.74	5.61	5.56	5.53	5.48
HP	5.53	5.44	5.51	5.69	5.76	5.79	5.63	5.56	5.60
IBM	5.43	5.57	5.61	5.61	5.65	5.60	5.58	5.51	5.48
Replacement Parts Availability									
Dell	5.88	5.85	5.90	6.00	6.13	6.10	6.02	5.95	5.84
HP	5.71	5.64	5.63	5.77	5.93	5.97	5.84	5.84	5.91
IBM	5.49	5.59	5.59	5.68	5.82	5.73	5.71	5.85	5.86
Server Management Features/Ease of Management									
Dell	5.56	5.51	5.46	5.63	5.66	5.69	5.72	5.61	5.35
HP	5.81	5.71	5.69	5.80	5.82	5.87	5.84	5.85	5.79
IBM	5.46	5.64	5.70	5.53	5.43	5.46	5.50	5.56	5.50
Overall Ease of Doing Business									
Dell	5.82	5.85	5.98	6.03	6.06	6.10	6.07	6.05	5.91
HP	5.75	5.63	5.64	5.81	5.82	5.88	5.88	5.86	5.82
IBM	5.43	5.64	5.62	5.57	5.70	5.64	5.55	5.63	5.73
Overall Value									
Dell	6.12	6.06	5.99	5.96	6.04	6.22	6.18	6.09	6.04
HP	5.54	5.49	5.51	5.53	5.58	5.75	5.73	5.71	5.74
IBM	5.35	5.50	5.60	5.53	5.53	5.64	5.60	5.61	5.62
Model Configuration									
Dell	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.71
HP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.99
IBM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.82
Relationship With Sales Rep									
Dell	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.43
HP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.66
IBM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.85
Overall Satisfaction									
Dell	5.98	5.88	5.90	6.01	6.07	6.17	6.11	6.03	5.91
HP	5.84	5.71	5.70	5.83	5.88	5.99	6.02	6.03	5.99
IBM	5.69	5.68	5.73	5.73	5.73	5.78	5.81	5.80	5.80

	1Q02	2Q02	3Q02	4Q02	1Q03	2Q03	3Q03	4Q03	1Q04
Loyalty									
Dell	4.12	4.07	4.05	4.14	4.12	4.12	4.01	3.91	4.03
HP	3.98	3.97	3.98	3.89	3.81	4.02	4.11	4.09	4.14
IBM	3.85	3.95	4.06	4.02	3.87	3.94	3.92	3.85	3.99

APPENDIX F: STUDY DESIGN CHANGES

The changes to the 1Q04 study design took effect on Jan. 2, 2004. The current reporting period, being a compilation of data for a six-month period, represents a transitional reporting period.

SCORING METRICS

The satisfaction rating scale has been modified from the previous 12-point to a new 7-point scale. This has been changed since it was observed that respondents do not use the full range of the 12-point scale, which will increase data reliability; the actual analyses TBR performs will remain in effect. The satisfaction ratings collected prior to Jan. 2, 2004, have been adjusted from the 12- to the new 7-point scale.

The weighted satisfaction indices are now based on the new attributes. The data prior to Jan. 2, 2004 required an adjustment whereby the satisfaction indices were converted to represent the current attribute list (by combining needed attributes that were previously represented by two separate attributes, these scores were averaged) less the two new attributes. Consequently, all past satisfaction indices have been changed from those reported in prior reports. The overall changes have been minor; the patterns of the satisfaction indices over time have remained consistent with those reported in 4Q03 and before. The current 1Q04 report represents a transitional reporting period, since one-half of the interviews were conducted using the previous methodology and the second half were conducted using the new format. All necessary adjustments have been made in order to bring the data together into this quarterly report.

CHANGES IN ATTRIBUTE COVERAGE

Other changes beginning with the 1Q04 study involve removal of satisfaction attributes that were no longer relevant, merging of similar attributes into a single category (i.e., attributes that were viewed as indiscernible by respondents based on their tendencies to rate them similarly), and addition of some new attributes. The table below details all changes made to the Intel-based server segment attributes.

In order to continue our method of tracking the vendors' scores, historical data sets have been revised so they match the current list of selected satisfaction attributes. The weighted satisfaction indices for past quarters have been recalculated by combining some attributes while removing those that have been discontinued. Consequently, historical mappings of the weighted scores will differ from past presentations.

2004 Attribute Changes in TBR Intel-based Server Customer Satisfaction Studies (Beginning Jan. 2, 2004)

New Attributes	Removed Attributes	Combined Attributes
Model Configuration Consistency	Hardware Performance	Hardware Quality: Combines hardware reliability and out-of-box quality
Relationship With Sales Rep	Volume Discounts	Overall Value: Combines price/performance and TCO
	Ease of Configuration/Set-up	On-site support response and expertise combined into one category for On-site Support Quality
	Scalability	

ADDITIONAL SURVEY INSTRUMENT CHANGES

Some questions were deemed redundant, such as vendor positives and negatives, which closely track the satisfaction scores. These questions provided little additional information concerning satisfaction and have been removed. Some new questions include respondent's involvement with purchasing decisions, average times to resolve problems via phone, on-site, or depot repair for notebooks and preferred brands if price were not an issue or consideration. Since the new format went into effect on Jan. 2, 2004, some of the new questions have only been included for three months and will be reported in 2Q04 when TBR has collected sufficient samples of data.