
Total Cost of Ownership – TCO

and Sybase® Adaptive Server® IQ Multiplex™



by Larry Hendershot, President
Associated Management Group

Total Cost of Ownership – TCO

about the author

Larry Hendershot is an expert in presenting a simplified approach to what has become a complex subject. Mr. Hendershot has more than 20 years of experience with Total Cost of Ownership (TCO) concepts and has been a leader in expressing traditional TCO elements versus related gains in overall business operations, an approach that he calls “Balanced TCO.” He is an internationally recognized authority and speaker about advanced operations and the management disciplines required to proactively support service level commitments for future information processing. Larry has developed process metrics and models for determining the TCO and return on investment of technology feature/function and cost/benefit analysis across the business enterprise for the business and user community.

Abstract

We have entered difficult economic times from which no individual, organization, or department is immune. In these troubled times, we can no longer afford to just throw money and technology at a business issue or problem; it is no longer sufficient for IT to simply add value to the enterprise. Instead what IT can and must do is add business value without incurring millions of dollars of additional expense. To this end, customers are asking vendors for more visible benefits and justification with their proposed technology solutions. The traditional Total Cost of Ownership (TCO) model that looks at hardware, software and personnel is falling short of today's customer requirements. The continued reduction in technology costs (30% to 40% annually) and the increase in personnel and business infrastructure costs (5% to 10% annually) demand that the cost/benefit ratio of IT technology services to the user community and business be included in the overall TCO calculations. This cost/benefit should be part of the TCO and return on investment (ROI) calculations.

The Sybase® Adaptive Server® IQ Multiplex™ (IQ Multiplex) data warehousing engine was designed from the ground up for the unique requirements of business intelligence. The column versus row architecture provides great technology savings for the IT organization as well as cutting-edge productivity improvements for the business community. This document will address the technology and business aspects of TCO as defined by AMG, Inc. plus the TCO of IQ Multiplex. This will include TCO observations and trends from studies and customer proof of concept evaluations.

Historically Speaking

Traditionally, the industry has looked at TCO as the cost of hardware, software and personnel to install, operate, manage and maintain an IT technology configuration. Today, however, customers are raising the

bar by requiring vendors to include the business community's cost/benefit for their proposed IT technology features and functions.

The primary intent of an IT delivery system is to support and/or improve the efficiency and productivity of the business community it serves. Therefore, anything that detracts from or adds to the business community's ability to perform daily tasks should be part of the TCO calculation. This could include a proposed solution's improved feature/function in availability, performance or timely access to information that can raise the bar of accepted application performance criteria. Older systems not meeting the new standard of performance are then viewed as a cost to the overall delivery system performance.

The challenge facing the industry today is a new paradigm for TCO evaluations: the inclusion of business along with technology in TCO evaluations. What follows is a format for the standardization of TCO.

TCO Business Drivers

Any time information access is inhibited or response time is unacceptable, the user and business community are impacted. Availability and performance service levels are established, creating metrics to be managed, too. However, these service levels must be realistic and cost-effective for the whole business. Unacceptable availability and performance play an important part in the monetary impact on the business.

The true TCO for a proposed IT solution must include the business cost as well as the technology cost. If we look at technology alone, we are leaving the most important parts (the business and user community) out of the TCO assessment process. Technology and business should be part of any TCO assessment.

New business intelligence infrastructure software, such as Sybase's IQ Multiplex, can significantly change the way business is done. For example, IQ Multiplex's ability to respond to queries in seconds and minutes instead of hours or overnight will have a major impact

TOTAL COST OF OWNERSHIP – TCO

on the business community's decision-making and customer service offerings.

Defining Technology and Business TCO Terms

The intent is to provide additional granularity to the TCO assessment to better understand each of the elements and their contribution to TCO. This granularity will be accomplished via seven levels of TCO:

Levels of TCO
1) Hardware
2) Software
3) Personnel
4) Availability
5) Performance
6) Recovery
7) Application

The first three levels are the traditional hardware, software and support personnel required to plan, install, operate and maintain the technology solution. This is the *technology* TCO assessment.

The second three levels (4 through 6) address the potential monetary cost/benefit on the user and business community. This depends on how the proposed solution(s) performs relative to availability, performance and recovery. Anything causing delay or improvement has an impact (cost) or benefit on the business. These factors must also be part of the TCO evaluation. This is the *business* TCO assessment.

The seventh level (application) has recently been added to the business level to address the value (cost/benefit) of a proposed solution versus current configuration feature(s)/function(s) relative to improvements to the business.

This TCO granularity also provides the ability to evaluate trade-offs between proposed vendor options. For example, it may be worth paying more for software

functionality to reduce operation and support personnel costs while improving business and user productivity – resulting in improved efficiency and performance for the company.

Technology TCO Assessment

The technology TCO calculation looks at all costs associated with the hardware, software and personnel to plan, install, operate and maintain the proposed solutions.

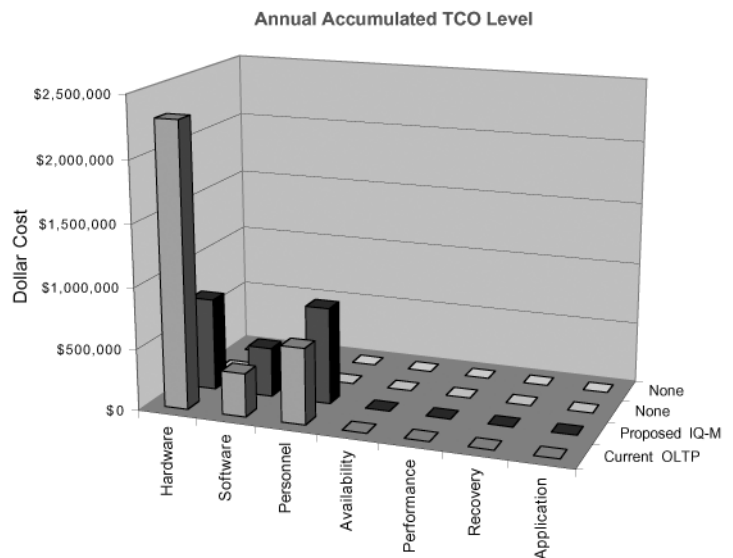


Figure 1. Technology TCO Levels 1, 2 and 3

Level 1 Hardware (floor space, acquisition, maintenance, power, cooling, etc.)

For the most part, hardware pricing has been reduced to a commodity. This includes the cost of the hardware plus environmental cost.

Major contributor to Level 1 hardware TCO:
price of hardware.

Sybase IQ Multiplex Observations: Sybase's IQ Multiplex architecture dramatically reduces the requirements for host processing and physical storage

space. Initial Sybase studies show processing time eight to 12 of times faster than OLTP-based engines. And due to IQ Multiplex's data compression capabilities, physical storage requirements are reduced by 20% to 80%.

Level 2 Software (acquisition, maintenance, number of licenses, etc.)

This includes the acquisition and maintenance costs for the software product(s). The intent is to identify similar feature function for comparison purposes.

Major contributor to Level 2 software TCO:
price of software.

Sybase IQ Multiplex Observations: IQ Multiplex pricing is based on the number of host CPUs, not the number of users. This will simplify the accounting process and provide a pricing advantage for larger user communities.

Level 3 Personnel (operations, support, vendor, consulting, etc.)

The personnel costs take on a different perspective. Although the hardware and software technology features and functions may be similar, the ease of use and time required may differ. Skill levels and number of staff will differ between sites.

Major contributor to Level 3 personnel TCO:
regional salary ranges, skill level of personnel.

Sybase IQ Multiplex Observations: IQ Multiplex will reduce the DBA and performance administration time due to the reduction in physical hardware (host processors and storage) requirements. In addition, IQ Multiplex requires no tuning, which reduces the need for staffing in this area. The data also shows that training time on IQ Multiplex is 25% to 35% of that required for traditional OLTP engines used for data warehousing.

The Business Section of TCO

TCO assessments in the past tend to stop at Level 3. At this point we have a cost value for current and proposed vendor technology solutions. However, this provides no real understanding of the solution(s) performance relative to service levels and business requirements. Making a purchase decision on cost alone at this point may or may not be the best option. How well the solutions perform against service level commitments will determine the impact on the user community as well as the corporate bottom line. This can be significant. Consider availability of information during scheduled hours of application availability, or the timely access to desired query results in seconds or minutes as opposed to hours or overnight. Based on storage efficiency, also consider the value of access to a larger set of historical data, for example, reduced processor cycle requirements, less physical storage and a highly scalable architecture allow for accessing two to three years as opposed to one year of historical data.

The next four levels look at the impact on the user community's productivity and business revenues. This requires some understanding of the user community and the business itself.

User Community (number of users, average wage, hours at keyboard, LOB revenue, etc.)

The user and business communities use the IT delivery system to perform their day-to-day tasks. An understanding of the business is required to properly assess the impact (cost) of meeting or not meeting service level commitments. In most cases the metric information is readily available, particularly with companies that have a quality program in place. The desired metrics for quality measurements are very similar to those determining TCO.

The size of the user community, annual salaries, the business application(s), the annual LOB revenues, and profile of the users' job function all contribute to

the integrity of the user and business TCO assessment. Any and all impacts (cost) to normal operation should be considered in calculating the business TCO.

Business TCO Assessment

TCO Levels 4, 5 and 6 address the proposed solution’s cost (impact) on the business and user community in the areas of availability, performance and recovery. If the user and business communities are inhibited from doing their day-to-day work, they have been impacted and a cost occurs.

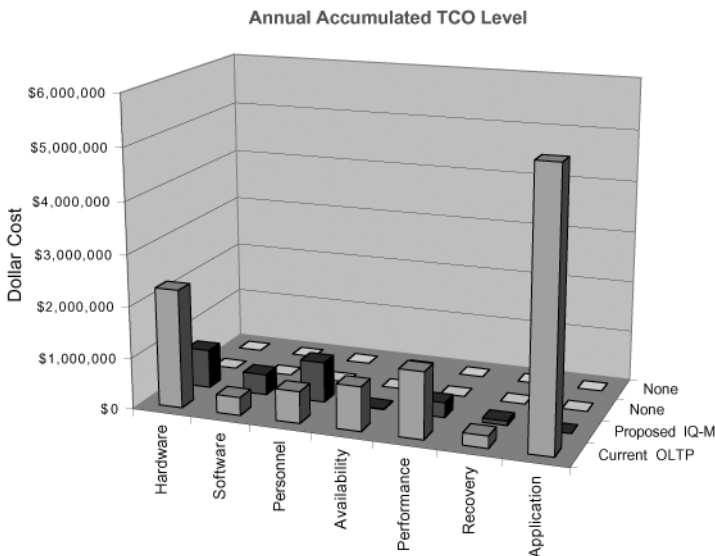


Figure 2. The addition of business TCO Levels 4, 5 and 6

Level 4 Availability (scheduled and unscheduled outage by application, etc.)

Any time the user community loses access to desired information, it has been impacted. This includes outages from any and all components of the delivery system (processor/server, network, storage, application, system management software, etc.). A loss of any component can be considered an outage if it inhibits access to desired information or data, including being late for scheduled uptime.

When does poor response time become system

unavailability? This depends on the business application process and how the user performs his or her day-to-day activities. This user profile assists in defining when the system is considered unavailable. If the user enters a state of rest, waiting on a response, he/she is impacted (the system is unavailable). If the user is busy with another task while waiting on a response, he/she is not impacted. See TCO Level 7 (application) for time delays in access to information.

Major contributor to Level 4 availability TCO:
length of outage or delays in scheduled up time
due to third-shift processing.

Sybase IQ Multiplex Observations: IQ Multiplex reduced processing requirement means faster batch query processing and quicker access to ad hoc query results. This has shown to be seconds and minutes versus hours or overnight with OLTP-based data warehousing engines.

Level 5 Performance (response time commitment, response time actual, etc.)

From the business and user community’s point of view, performance analyzes the productivity impact due to poor response time to the person(s) requesting information. How well does the delivery system respond to a user’s request? This impact will vary based on the specific customer application, size of the user community and the user application profile.

Depending on the user profile, a deterioration of response time may or may not have an impact on the productivity of the user community. For example, a 10-second response time may have a devastating effect on design engineers’ productivity at the keyboard. However, it may have no effect on a retail clerk during a credit card authorization process because between the swipe of the card through the credit card reader and the returned authorization code, the clerk is busy filling out the retail slip or wrapping the purchase with no interruption in work process.

TOTAL COST OF OWNERSHIP – TCO

For data warehouse queries, if responses are expected to take hours or overnight, the user community may begin another work-related task rather than wait for the query answer. The time value of information will be part of the TCO Level 7 (application) calculation.

Major contributors to Level 5 performance TCO:
response time impact, number of users and
application profile.

Sybase IQ Multiplex Observations: Ad hoc query response times of seconds versus minutes or hours with OLTP-based systems open the door for user productivity and sophisticated and timely decision making. Experience over time will determine the percent of current query affected. Meanwhile, it is useful to ask from a business perspective the value of queries that are 10 to 100, even 1000 times, faster. What is the value of hundreds or thousands of users? What is the value of hundreds and thousands of queries?

The near linear scalability of users and data size with IQ Multiplex minimizes or eliminates degradation during peak query workloads.

Level 6 Recovery (number of outages, user recovery time, etc.)

From the user's perspective, recovery (Level 6) is focused on the time it takes to get back to the failure point following the restoration of business application to production status. This may be a customer service person re-establishing phone contact with a customer, or manually re-entering lost transactions not captured or logged at the time of an outage and so on. This includes manual assessment looking for corrupt files requiring manual recovery.

Proactive configuring for availability or automated recovery software will minimize the number of outages to the system. The number and length of outages contribute to the recovery impact on the user community. It is at this point that the Mean Time Between Failure (MTBF) and the restore time for a particular

technology solution can play a significant roll in the productivity of the user community recovery.

Major contributors to Level 6 recovery TCO:
number of outages, length of outage,
number of users.

Sybase IQ Multiplex Observations: Automated recovery or fail-over routines are part of the IQ Multiplex architecture. This proactive approach to availability minimizes or eliminates the number of recovery action taken by the user community.

Level 7 Application (line of business revenue, budgets, application feature/function, management process maturity, etc.)

TCO Level 7 (application) looks at the potential impact/benefit of an application's feature(s)/function(s) as seen by the business management and/or user community. Timely access to information (minutes versus hours) can impact a decision support system (DSS) positively (minutes) or negatively (hours). The business management team will know the value of timely access to information and the potential impact (percentage of cost/benefit) on the annual revenue or budget.

In addition to information access, the maturity of the business or management process receiving the information plays a role in determining the true business benefit of timely access to information. How formal or mature is the business process? Is the business process reacting to situations or are formalized policies and procedures in place to process timely information? Is the information used effectively or lost in the maze?

When a proposed solution improves the timely access to information by a magnitude or more, the bar of accepted performance is raised. Older systems not meeting the new standard of performance are now seen as inhibiting productivity and viewed as a cost to the current delivery system performance.

TOTAL COST OF OWNERSHIP – TCO

Major contributors to Level 7 application TCO:
 application feature/function, business
 management value assessment, management
 process maturity, revenue/budget metrics.

Sybase IQ Multiplex Observations: IQ Multiplex Multiplex’s significant improvement in processing speed – dynamic handling of ad hoc queries with response time in seconds, not hours – provides a significant re-engineering opportunity. The door is open to rethink how information is used in DSS and other applications requiring quick query response.

Summary

When evaluating all seven levels of TCO (technology and business), the specific contributors to costs and benefits to the corporate bottom line become clearer. This proposed TCO process methodology adds a degree of simplicity to a complex issue by identifying each level’s contribution to TCO.

CIOs, CTOs and others are asking more and more about the TCO as it relates to the business complex as a whole. The business assessment provides visibility to the costs/benefits of feature(s)/function(s) for the business enterprise. In the past, the user community has raised concerns over IT services, usually noted as “scream level.” Now, using the above TCO methodology, this user scream level can be quantified (i.e., the business impact and service issues can be addressed and evaluated from a TCO perspective).

Once we have the technology and business TCO numbers for a current application system, we have a base to compare proposed changes with current configurations. The investment in new features, functions and procedures and the improvement in the business economics will feed traditional ROI calculations.

TCO will provide a cost number for a specific configuration (technology TCO) and its impact on the user community (business TCO). A proposed configuration will provide the proposed technology

TCO and a proposed business TCO. With these TCO numbers it is possible to develop an ROI by comparing the current and proposed TCO numbers. The result is a technology ROI plus a business ROI. The “what-if” scenarios of TCO Modeling will allow management to determine its comfort level by varying the input data while reviewing both the TCO and ROI results.

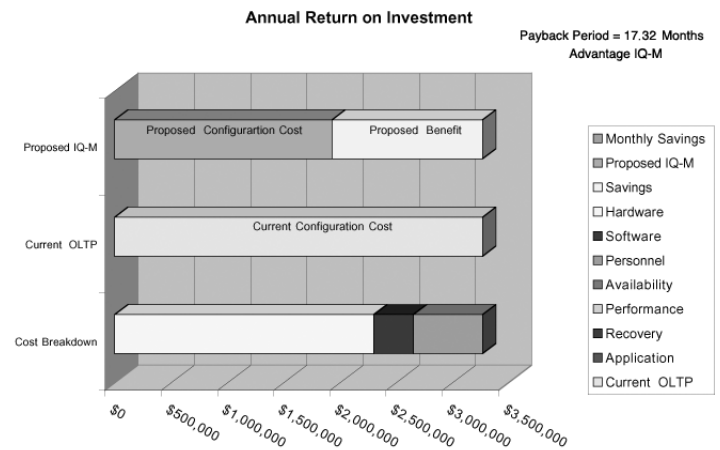


Figure 3. Technology return on investment (ROI)

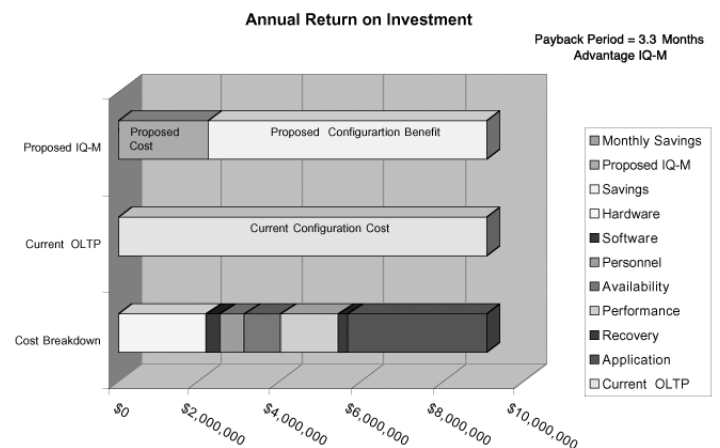


Figure 4. Technology plus business ROI

Including the business benefit in the ROI calculation can significantly reduce the payback period of the proposed solution. Having business management's participation on the TCO process provides a significant contribution to the cost/benefit analysis.

Conclusions

- As technology costs continue to drop and personnel and business costs continue to rise, the inclusion of the business and user community (Business TCO) in the assessment becomes more significant in determining the true TCO. IQ Multiplex is a prime example for this type of TCO assessment.
- The software architecture of IQ Multiplex provides significant improvements in processing cycles, storage space and data management efficiency. This results in a major reduction in processors and physical storage space, reducing hardware costs by 50% to 80% depending on size and complexity.
- The increased speed in query processing by IQ Multiplex can return answers in seconds and minutes as opposed to hours or overnight with OLTP-based engines. The availability improvement of queries and reports can provide an enormous improvement in user productivity. Studies are currently under way to quantify this productivity improvement.
- IQ Multiplex's ability to process concurrent queries from multiple sources and complex ad hoc queries in a timely manner opens the door to more sophisticated decision making by business managers and customer reps, resulting in significant opportunities for cost reductions and increased revenues. Sybase customers have routinely reported savings of \$1 million or greater,

due to better information, more timely information and more accessible information.

The Next Step

Do you know your significant contributors to technology and business TCO relative to your current data warehousing application? Would you like to?

Please contact Sybase for more information about how IQ Multiplex might help contribute to your company's latest cost-saving initiative. Contact your Sybase representative at infobi@sybase.com.

If you are interested in exploring the AMG, Inc. TCO process in more detail, contact Larry Hendershot at (303) 465-6299 or larryhendershot@aol.com.

Note: Graphics are representative of initial TCO Level 1 through 7 relationships for Sybase's IQ Multiplex (IQ-M). Each assessment will provide different results based on application and business profile.

