# Data Warehousing
# Total Cost of Ownership

# Sun Microsystems and
# NCR Teradata


*Aligning Business and IT to Improve Performance*

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# Data Warehousing Total Cost of Ownership Research on Sun Microsystems and NCR Teradata

## Research Report



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Ventana Research performed this research for a fee to determine the Total Cost of Ownership (TCO) of data warehousing on Sun Microsystems and NCR Teradata for Sun Microsystems. This document is based on our research and analysis of Sun and NCR Teradata data warehouse configurations for real-world organizations utilizing publicly available pricing and configuration information found on the Internet. Ventana Research identified data warehouse configurations; we defined the Sun configuration based on our knowledge of the data warehouse industry and compared with NCR Teradata configurations on the company's website and in other publicly available information.

Our explicit purpose was the investigation of TCO for enterprise-class terabyte data warehouses. This research is not intended for use outside of this context and does not imply that organizations are guaranteed success by using only TCO as a basis for reducing costs. Moreover, gaining the most benefit from your data warehouse requires that you examine TCO individually in your organization.

We certify that Ventana Research wrote and edited this report independently; that the analysis is a faithful representation of our experience and knowledge in TCO and data warehousing; and that the analysis and conclusions that we made are our own.

# Executive Summary

It's a conundrum – research shows most organizations do not take the time and effort to undergo a data warehouse total cost of ownership (TCO) analysis, while at the same time cost overruns continue. Using TCO as a tool to understand the full scope of data warehousing costs can reduce budget surprises and mitigate risk. Our research indicates that organizations that do not conduct a TCO analysis potentially will overspend millions of dollars in three years. We've established a TCO model and framework that you can leverage to perform a similar study in your organization. It may save you money and valuable time.

Challenging for IT and finance, it is not simple to manage the initial and ongoing technology costs for a terabyte-plus data warehouse. It takes times and resources to effectively assess data warehousing complexities. By leveraging TCO and by conducting more in-depth IT planning and budgeting, data warehousing can be aligned to larger IT portfolio management and consolidation initiatives.

Ventana Research, a leading research and advisory services firm in data warehousing, business intelligence and performance management and Consensure, a leading business and economic case software and services company, conducted this research into data warehousing TCO to provide insight on the costs and cost variances between two large suppliers – Sun Microsystems and NCR Teradata. We accomplished this by developing and applying a TCO model to identify software, hardware and personnel costs over time. This research provides direct insight into potential financial savings, but requires that you learn how to use the savings to reach maximum benefit in your organization.

During our three-month research, we examined Sun Microsystems' and NCR Teradata's terabyte- (TB) class data warehousing systems. This involved modeling and analyzing software, hardware and personnel costs. We examined initial and ongoing costs and leveraging our knowledge of what real-world companies are doing today in regard to costs and consolidation in data warehousing.

We found significant cost variances for initial purchase and upgrades, including maintenance, between Sun and NCR Teradata. These variances can best be seen Figure 1. The costs for NCR Teradata were substantially higher than Sun's. The variance was $2.3m for 2 TB, $4.2m for 4 TB and $12.2m for 10 TB. This research revealed that NCR Teradata pricing will increase per TB from 2 TB to 10 TB configurations.

The research examined costs associated with personnel, hardware and software categories. One example of higher costs were storage cost. For example, the cost of 2 TB of data storage on the NCR Teradata system was more than $500k vs. only $182k for comparable data warehouse TB configuration on the Sun system.

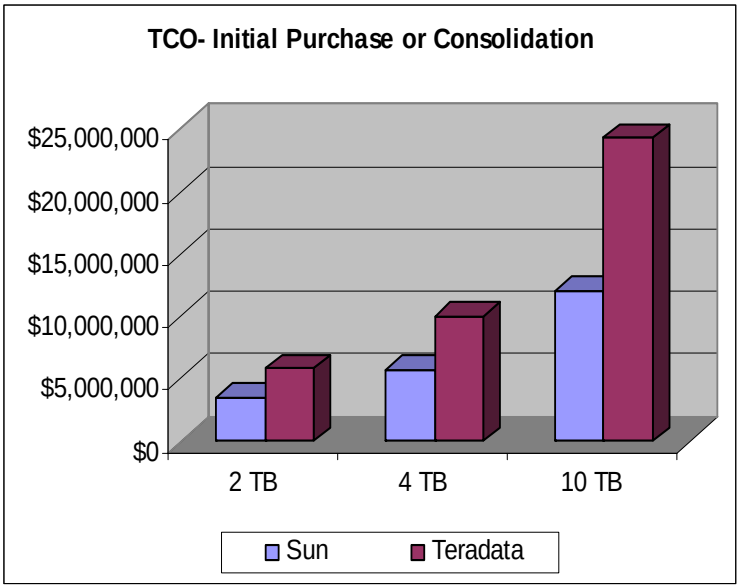



**Figure 1: TCO - Initial Purchase or Consolidation**

Our research found that Sun requires more storage for similar TB data warehouse configurations based on their utilization of uncompressed data compared to NCR Teradata utilizing significant amount of compressed data in their configurations. Even with this, Sun still had a significant lower cost per TB of storage and is more representative of data warehouse configurations.

Another example was on the software side where NCR Teradata charges more for its DW database software than Sun, which includes Oracle database in this configuration. The variance on these costs was substantial as well, where NCR Teradata was more expensive than Oracle by $860k for 2 TB, $1.7m for 4 TB and $12.2m for 10 TB.

To minimize TCO, it is vital to find a technology supplier that can leverage your existing skills sets and interoperability in your enterprise. This is critical when you need to add users, increase processing throughput, or adapt and expand your data warehouse configuration. How will you reconfigure your systems cost effectively with minimal impact to your project?

Sun provides a more cost-effective, low-risk method for adding storage and CPUs into its SMP-architected Sun server technology than NCR Teradata, with its massively parallel processing (MPP) approach. The hardware and personnel costs for maintaining MPP configurations are substantial and referenced in this white paper.

Let's summarize the key cost factors for you to analyze when assessing data warehousing TCO for your organization.

- Software – overall cost and maintenance of database system
- Hardware – incremental costs for storage and server/CPU initially and over time
- Personnel – costs of maintaining a team of employees on specialized or standard hardware and relational database management system (RDBMS) and cost of professional services

Optimally configuring your data warehouse is fundamental to your project success. You need to appropriately plan cost reductions. In our research, we found that Sun provides the benefit of a sound investment that reduces the costs and complexity of your IT environment. Our research from organizations and this analysis has found a significant different approach to your data warehousing pricing. The cost of scaling with NCR Teradata from a low end entry point of 1 TB to full size 10 TB have found pricing lifts as you scale your data warehouse. This could have significant impact on your budget.

Beyond the TCO advantage by Sun, our analysis of these two providers reveals two providers that are just fundamentally different in how they approach the market. Sun is focused on delivering high volume - low cost systems that are interoperable with your enterprise while NCR Teradata delivers low volume - high cost systems for data warehousing. The flexibility and openness of the Sun architecture results in less expensive professional services, thus potentially providing more available resources for configuring Sun-related systems than there are for NCR Teradata. You have to determine which best fits your organization.

Our research and analysis has found significant findings which is the foundation for recommendations for you to seize the opportunity to examine your existing or potential new data warehouse investments from a complete TCO viewpoint. You should analyze the initial and ongoing software, hardware and personnel costs, and determine your potential savings. Ventana Research, Consensure or even Sun Microsystems can conduct this simple TCO exercise in a very short period and provide you the knowledge to make your decision.

# Introduction

The CIO mandate is clear: simplify and consolidate the IT portfolio to reduce costs, and become leverage existing resources more efficiently. Whether you want to simplify and consolidate existing data warehouse systems or are planning to invest in new data warehouses, you should closely examine data warehousing suppliers.

What are the critical qualities that you should examine? Start with a clearly defined budget for your data warehouse. Having a multi-year budget should be at the core of any business and IT project, and your data warehouse should be no different. The reality is that most organizations do not perform business case and budget-level planning necessary to reveal the full costs and resulting value of data warehouse ownership.

The last thing you want is unexpected technology expenditures, so anticipating unplanned cost overruns and their budget implications is an important step in mitigating future risk. Cost overruns on data warehouse projects are avoidable if you utilize TCO, a critical cost management tool. The importance of utilizing TCO was the premise for this research.

Ventana Research, the leader in research and advisory services in data warehousing, business intelligence and performance management performed the research on TCO in terabyte-class range data warehouses in partnership with Consensure (http://www.consensure.com), the leader in business case software and services. Leveraging our combined industry experience in data warehousing and business intelligence over the last two decades, we configured an analysis-based reference model to conduct the analysis.

We focused our research on Sun Microsystems and NCR Teradata, the two vendors that represent the largest share of implementations of data warehouses in the terabyte range. The research was conducted from June through August, 2004. We extracted the NCR Teradata pricing from the NCR Teradata website at http://www.teradatalibrary.com/pdf/pricing.pdf.

Our goal in this research is to provide hard facts for use in evaluating the costs of operating enterprise-scale, terabyte-class data warehouses. Our specific objective was the analysis of lifecycle software, hardware and personnel costs over three year periods. The TCO model was designed to include operating conditions, growth rate, cost drivers, configurations and financial criteria for terabyte-scale data warehouses. The model can optionally include Informatica for providing world class enterprise data integration. These represent real-world configurations used in global organizations and are traditionally leveraged in enterprise-class business intelligence deployments by vendors like Actuate, Cognos and others.

To ensure that our TCO analysis was objective, we conducted it using specific configurations and cost categories from publicly available information and on the Internet. We did not take into account any discounting that may be provided to your enterprise by either provider.

This TCO analysis provides information you can leverage for your own data warehouse evaluation and can potentially save you millions of dollars. By understanding the installation and maintenance requirements of a growing data warehouse environment, you can better decide how to prepare your annual budget.

# Total Cost of Ownership Methodology

The TCO methodology used in this research is based on a data warehouse reference model to determine the configuration and costs over a three to five year period. We used the reference model to fairly calculate and compare TCO calculations of Sun versus NCR Teradata. We also leveraged our knowledge and insight into organizations that have adopted Sun or NCR Teradata technology.

*The reference model used in this white paper can be easily modified to your specific configuration requirements through a custom services engagement with Ventana Research and Consensure.*

TCO analysis examines the software, hardware and personnel costs of a project initially and over a set period. The period analyzed is usually three to five years for investments that are sustainable and significantly capital intensive from the outset. Costs then can be divided by the number of years planned for the investment to determine the annualized costs.

The first step in determining the TCO is to conduct a site profile on the data warehouse requirements of the existing systems or projected new system. The key parameters of your TCO plan will include many of the basics traditionally utilized in systems planning. What is the average number of users on the system during peak and low periods? What is the amount and cost of storage space required for growth? What is the level of performance and scalability required to support the project? These questions and others will help you determine potential costs over time, not just during the initial implementation.

Identifying the optimal technology configuration, including the initial hardware, software and personnel costs is required. The project plan and technology configuration can enable you to quickly determine the level of professional services and employee labor costs required to implement your data warehouse. You should not underestimate personnel costs, especially if you have to train and maintain employees on non-standard proprietary hardware and software.

The profile questionnaire provides the required parameters to drive the TCO calculation and simplify the configuration. The six groups of questions and parameters we used in our TCO research are:

**Performance/Scalability** –The availability of the data warehouse and the level of scalability for the system, including the data, CPU and user throughput.

**Peak Operating Conditions** – The frequency, quantity and type of users that will be interacting with the data warehouse.

**Annual Growth Rate** – The level and rate of growth of user types during the TCO period.

**Raw Data Cost Drivers** – The initial amount of user data and the factor and growth of raw data, including the ratio for user and raw data storage.

**Data Warehouse Options** –The required options for the data warehouse system including advanced high availability; extraction – transformation – load (ETL) software; backup – archival – retrieval (BAR) software; management workstation; and RDBMS pricing.

**Financial Criteria** – The time frame and cost of money for TCO.

The TCO model enables you to determine the proper configuration and calculate the cost categories for the data warehouse and for specific costs in each of the categories. The eight

cost categories for the data warehouse configuration that comprise the TCO over the life of the project are:

**Server Hardware** –Server technology and any required interfaces, cables, adapters or other server-related options. We selected the server hardware for each configuration based on performance, scalability and growth requirements.

**Storage** – The complete list of technology for storage, including cabinets, racks, storage and cables. Storage costs were directly provided by the technology providers.

**Server Software** –The operating system, backup software, monitoring and enterprise software is to support the data warehouse. Sun has very little server software, relying on third-party software for RDBMS; NCR Teradata incurs costs for its RDBMS in this category.

**Professional Services** – Any external contractors needed to support the data warehouse. We have included the initial implementation services for new data warehouse scenarios. NCR Teradata says there are only 1600 trained NCR Teradata consultants compared to more than 100k trained Sun and Oracle consultants, so the costs for NCR Teradata professional services are set at 1.5 times the costs of Sun.

**Employee Labor** – The required employee labor to support the data warehouse for the first year and duration of the project, depending on the scenario presented. In our calculations, we assumed the same number of internal employees for Sun and NCR Teradata implementations.

**Software and Hardware Maintenance** – Maintenance of server software and hardware. The TCO model includes a 10% maintenance fee for Sun's hardware and operating system and an 18% maintenance fee on NCR Teradata hardware and RDBMS.

**Third-Party Software** – All relevant software including RDBMS is included. This includes Oracle RDBMS for Sun configurations. NCR Teradata sells its proprietary RDBMS with its hardware. These configurations do not include extraction, transformation or loading (ETL) or data integration software.

**Third-Party Software Maintenance** - Maintenance of third-party server software, including 22% maintenance for Oracle RDBMS in the Sun configuration.

For the purposes of this research and analysis, we have placed these categories into three main cost groupings: software, hardware and personnel costs. This provides a direct method to compare technology providers and allows an "apples-to-apples" comparison in areas where fundamental differences exist (e.g., Sun's requiring a third-party RDBMS partner vs. NCR Teradata's selling its own RDBMS).

The TCO calculations in this research encapsulate the majority of key factors and requirements for most data warehouse systems. We did not include potential vendor discounts, as these may vary based on negotiation or existing negotiated discount structures. Like any analysis, there maybe additional items or areas that require further scrutiny, but this TCO model covers the majority of the costs and issues in configuring a data warehouse.

# Budgeting Multi-Terabyte Class Data Warehouse

Many organizations believe the initial and ongoing costs of their data warehouse cannot be contained or reduced. By performing a thorough TCO analysis and examination of multiple suppliers for new warehouses or consolidations of existing data warehouses, you may discover many options. You should perform this analysis annually to perform a routine check up on your data warehouse investment.

TCO analysis is not a new concept but many organizations do not undertake multi-year analyses. Sometimes, this is due to the significant amount of time spent on return on investment (ROI) and economic value-add (EVA) analyses. It is not necessarily bad to emphasize value, but many times this focus on benefits in order to justify costs leads to organizations not sufficiently scrutinizing underlying costs. While TCO is only one of many evaluation criteria for your technology provider, it provides a baseline metric that will assist in your IT and financial planning and is a requirement and the denominator for ROI.

We analyzed a multitude of scenarios for TCO of terabyte-scale data warehouses. These scenarios represent real-world terabyte class configurations and use a baseline for conducting analysis of technology providers. The two that will be evaluated are: a) first year TCO for 2 TB, 4 TB and 10 TB implementations, including critical cost factors for growth and b) three-year TCO for a 2 TB implementation that grows to 4 TB.

## TCO – New Investment or Consolidating Data Warehouse

Typical planning scenarios involve the acquisition of a new data warehouse system or consolidation of existing investments. To fairly analyze these two scenarios, we developed a first-year TCO and then analyzed variances between suppliers. This analysis provides enough data points to enable us to understand the cost of the two approaches. If you need further refinement and details; you can cost your specific configurations and compare them.

The data warehouse configuration was defined below. Parameters are further explained in the Methodology section of this white paper.

**Performance/Scalability** – The data warehouse configuration is designed for 99.99% availability, flexible levels of data, CPU and high levels of user throughput scalability.

**Peak Operating Conditions** – The data warehouse should support at least 1,000 casual users for report consumption, 75 analytic users and 100 power users for doing ad-hoc queries.

**Annual Growth Rate** – The forecasted annual growth rate by users is 5%, compounded based on assessment of user population and growing levels of sophistication in using information from business intelligence and data warehouse systems. This will require the right number of CPUs and configurations for acceptable user throughput.

**Raw Data Cost Drivers** – The initial amount of raw user data was 2 and 4 terabytes with no annual growth factor, as we are looking at first year costs. NCR Teradata utilizes compressed data while Sun utilizes uncompressed data that is more typical in data warehouse configurations

**Data Warehouse Options** – The data warehouses are to have advanced high availability features, excluding third party ETL and BI, which have been budgeted for in separate enterprise agreements. We included RDBMS to fairly compare technology vendors.

**Financial Criteria** – The time frame for calculating TCO is three years during which we will examine the full range of system maintenance.

This data warehouse configuration is typical for many large enterprises managing more than three years of historical data at detail and summarized levels. Let's examine the TCO for Sun versus NCR Teradata for an outright purchase of a 2, 4 and 10 TB data warehouse for a one-year investment. Utilizing the previously defined configuration parameters of Sun and NCR Teradata that are publicly advertised by the vendors, we came up with the following server configurations. Sun requires additional storage as they configure with uncompressed data compared to NCR Teradata which utilizes a higher ratio of compressed data for their data warehouse configurations.

| **Hardware Configuration** | **Sun** | | | **NCR Teradata** | | |
|---|---|---|---|---|---|---|
| **Data Warehouse Size** | 2 TB | 4 TB | 10 TB | 2 TB | 4 TB | 10 TB |
| **Server** | E6900 | E20k | E25k | 5380 | 5380 | 5380 |
| **CPU** | 12 | 20 | 44 | | | |
| **Nodes** | | | | 6 | 11 | 28 |
| **Storage (TB)** | 13.6 | 27.2 | 68 | 7.6 | 14.4 | 36.6 |

## TCO Findings

Fig. 2 shows the total cost of NCR Teradata for 2 TB is $5.8m -- $2.3m more than Sun, at $3.5m. In fact, the hardware component of this configuration shows NCR Teradata at almost twice the cost of Sun. In the 4 TB configuration, Sun continues to grow in cost savings and at 4 TB, where Sun is $5.8m and NCR Teradata is $10m -- $4.1m more expensive than Sun.

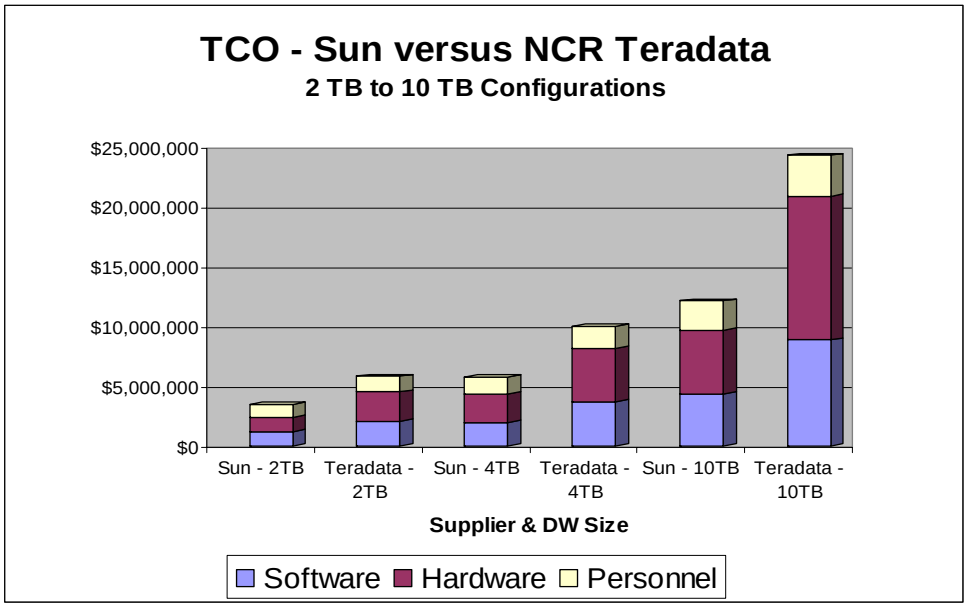



**Figure 2: TCO – Sun versus Teradata – 2 to 10 Terabyte (TB) Configuration**

At non-discounted prices, you could purchase the Sun 4 TB hardware configuration at the price of a NCR Teradata 2 TB configuration -- a significant cost variation between the two providers.

Even if you were to apply an overall flat discount of 10% for Sun and 20% for NCR Teradata, you would still save more than $1.5m with Sun on 2 TB configurations. If you doubled the discount for a 4 TB system (i.e., a 20% discount for Sun and 40% for NCR Teradata) you would still save more than $1.3m with Sun.

Let's examine the individual costs of this configuration to highlight the key cost differentiation between the providers.

**Software** – The software costs for Sun and NCR Teradata configurations in the same range, 34% to 37%, of overall TCO in 2- to 10-TB configurations. The bulk of the software costs were for the RDBMS. While NCR Teradata directly supplies the RDBMS, Sun depends on its partners (Oracle, in this situation). The Oracle RDBMS costs were substantially lower than that of NCR Teradata -- $865k lower at 2 TB, $1.7m lower at 4 TB and $7m lower at 10 TB. NCR Teradata would have to provide a substantial discount to match Oracle's list prices. The maintenance percentage was slightly higher for Oracle than for NCR Teradata, though it did not have a substantial impact on the overall TCO for Sun.

**Hardware** – The hardware components of these configurations were consistent for NCR Teradata -- from 42% to 45% of overall TCO. Sun's hardware percentage jumped from 36% to 44% of overall TCO based on movement from the E6900 to the larger E25k data warehouse environment. Fig. 3 shows that the cost per terabyte is more cost effective at three levels including complete TCO, total hardware and also just for storage. The cost per terabyte for storage is the Sun system is $182k – less than half that of NCR Teradata, where the cost per terabyte is more than $500k. The NCR Teradata cost per terabyte decreases only slightly at the 10 TB level.

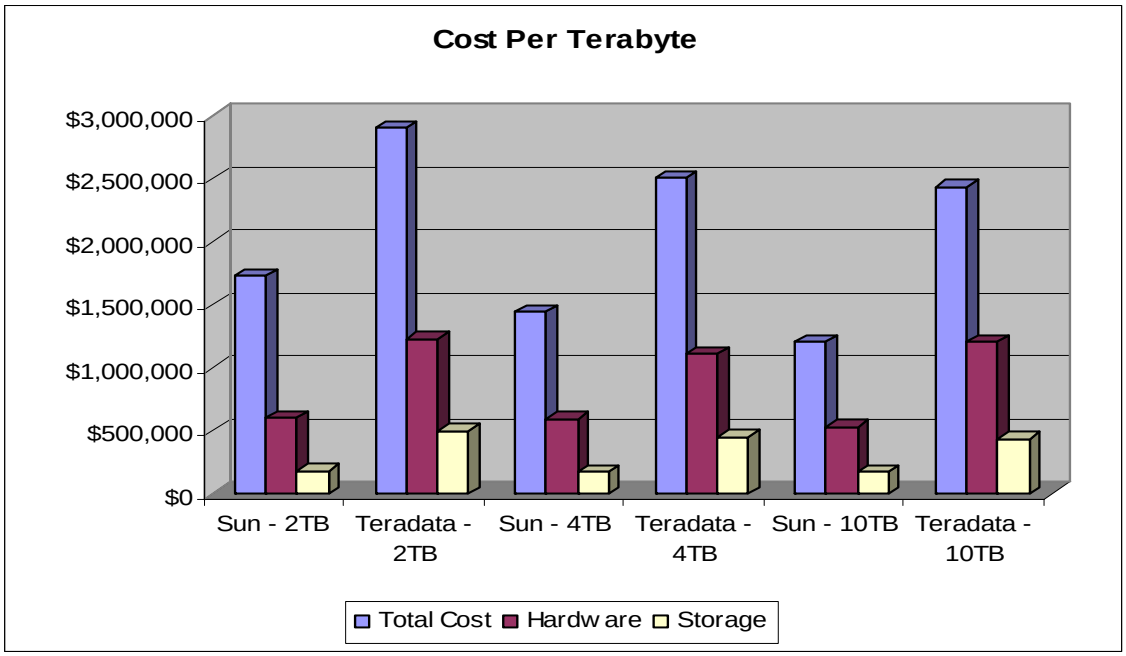



**Figure 3: Cost per Terabyte**

**Personnel** – The personnel component of these configurations represented a declining percentage of overall TCO because Sun and NCR Teradata implementations required the same level of employee labor and professional services for the first year. Our research in professional services found substantial more trained Sun and Oracle resources which overall typically cost 50% less than specialized resources for NCR Teradata.

### Summary Findings

This research on purchasing a 2, 4 or 10 TB data warehouse configurations yielded significant findings regarding one year cost savings. You can find savings opportunities with Sun through a straight TCO comparison without even examining the implications of storage costs over time, server architecture of SMP versus MPP, and accessibility and cost of support resources.

Why is there such a large difference between these suppliers? Our research showed that NCR Teradata costs scale as more hardware is required over time along with a significantly higher storage cost per terabyte than Sun. In addition, NCR Teradata's RDBMS software is substantially more expensive than Oracle's. Sun, based on the size and distribution strength of its organization, most likely has a lower cost of overall operations, enabling it to provide more attractive pricing for you.

Here are the summary points from our research in this scenario:

| Summary |
| --- |
| Higher overall savings for Sun versus NCR Teradata for similar configuration |
| Sun 4 TB configuration is the same cost as NCR Teradata's 2 TB configuration |
| Sun hardware and storage cost per TB is less than half the price of NCR Teradata's. |

## TCO – Three-Year Data Warehouse Costs

The next scenario is for data warehousing TCO over a three-year period. We examined the costs of Sun and NCR Teradata for an initial planned data warehouse of 2 TB with a 50% compounded growth reaching 4 TB in Year Three. This scenario includes costs for a higher class Sun E20k server even though the 2 TB Sun data warehouse could operate on a lower-class server as previously referenced in straight 4 TB configurations. For NCR Teradata, we used the same class 5380 server from the previous 2 TB and 4 TB configurations.

To fairly analyze these two providers, we developed a three-year TCO model and analyzed variances between suppliers. Since in most cases, these suppliers will provide a better negotiated price, we included the server and storage hardware in Year 1 and included software and hardware maintenance and employee labor costs for Years 2 and 3.

We used the data warehouse configuration from the previous example except for the raw data cost driver as defined here:

> **Raw Data Cost Driver** – The initial raw user data was 2 TB with forecasted annual growth of 50% and 1:4 ratio of user-to-raw disk space resulting in a 4 TB data warehouse in 3 years.

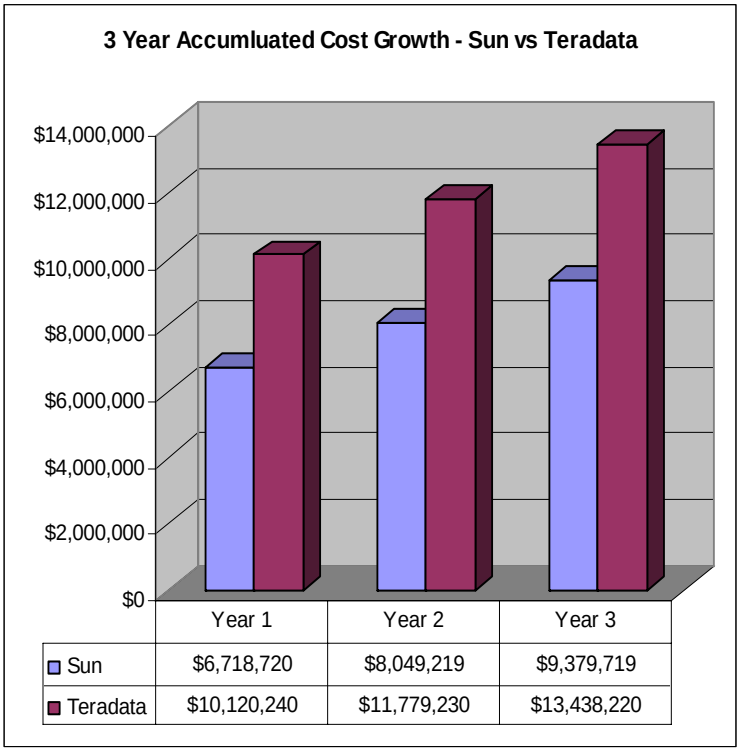
This data warehouse configuration is typical of large enterprises. Using the previously defined parameters of Sun and NCR Teradata, we modeled the following server configurations:

| Hardware Configuration | Sun | NCR Teradata |
| --- | --- | --- |
| **Data Warehouse Size** | 4 TB | 4 TB |
| **Server** | E20k | 5380 |
| **CPU** | 20 | |
| **Nodes** | | 11 |
| **Storage (TB)** | 27.2 | 14.4 |

## TCO Findings

Fig. 4 illustates that the TCO for NCR Teradata continues to grow from Year 1 to Year 3. The actual variance between Sun and NCR Teradata is $3.3m in Year 1 and $300k in Years 2 and 3. The overall TCO difference over three years shows Sun costing $4m less than NCR Teradata. The underlying software, hardware and personnel costs are similar to those in the TCO analysis for 4 TB data warehouse.

This cost savings realized through the use of Sun is substantial. Even if you were to apply an overall flat discount of 10% for Sun and twice that for NCR Teradata, you would save more $1.5m with Sun for 2 TB configurations. If you doubled the discount for 4 TB (i.e., 20% for Sun and 40% for NCR Teradata) you would still save more than $1.3m with Sun.




| | Year 1 | Year 2 | Year 3 |
|---|---|---|---|
| Sun | $6,718,720 | $8,049,219 | $9,379,719 |
| Teradata | $10,120,240 | $11,779,230 | $13,438,220 |

**Figure 4: 3 Year Accumulated Cost Growth**

## Summary Findings

The result of this TCO research on a three-year data warehouse investment has similar TCO and results as the first Initial or Consolidated Sun and NCR Teradata scenarios. Sun has an overall cost savings advantage of $4m over NCR Teradata.

In the case of unexpected growth in your data warehouse, necessitating additional storage and/or CPU capacity, the cost differential between Sun and NCR Teradata is quite substantial. From a hardware perspective alone, Sun will be half as expensive as NCR Teradata. Sun's configuration of uncompressed data compared to NCR Teradata utilizing compressed data still resulted in lower cost per TB for storage. It also will be much less expensive to configure, as NCR Teradata's MPP architecture requires more additional services to balance nodes, CPUs and storage than does Sun's SMP architecture.

Why is there such a large gap in costs between Sun and NCR Teradata? Beyond what is identified in the 2, 4 and 10 TB TCO scenarios earlier, the flexibility and openness of the Sun architecture results in less expensive professional services, as there are more available resources for adding storage, CPUs and configuration of Sun-related systems than there are for NCR Teradata. This is a critical area to watch for identifying future unexpected costs.

Without examining additional factors, it is very clear from the TCO comparison that you can realize substantial savings with Sun. Here are the key points from our research:

| Summary |
|---|
| Lower overall savings for Sun versus NCR Teradata |
| Sun 4 TB configuration for 3 year TCO is $4m less expensive |

# Data Warehouse TCO Leader

You should examine your data technology partner, not just on its technology, but on the company, products, services and R&D investment that will improve the value of your technology investment. Having a technology partner that is committed to openness and interoperability is crucial to maximizing the potential and lifespan of your data warehouse. Our research and analysis show that Sun is the Data Warehouse TCO leader compared to NCR Teradata.

While NCR Teradata is solely focused on the data warehouse market, Sun Microsystems delivers a broad range of technology – including data warehousing – to the entire market. Because of Sun's greater reach and penetration, it can provide economies of scale that result in lower cost of computing. The decision is yours and if you are willing to spend significantly extra for your data warehouse with NCR Teradata, this is entirely up to you.

Sun is a major provider of software, hardware and services and has made significant investments in innovative technology. Sun's overall corporate strategy is to reduce the costs and complexity of computing and to accelerate deployment through mobility with security.

The research into Sun and NCR Teradata revealed a fundamentally different strategy to pricing and TCO from these providers. The outcome of the research as seen in Fig. 5 found that NCR Teradata utilizes a pricing model that increases as size of the data warehouse scales in terabytes. This lift pricing could have substantial impact to your investment.

A Sun technology investment pays off through advancements in computing architecture. Sun's investment into symmetric multi-processing (SMP) has made it a predominant approach to data warehousing and overall computing. Sun has applied its technology to key drivers in data warehousing such as availability, scalability and configurability for a lower overall TCO..

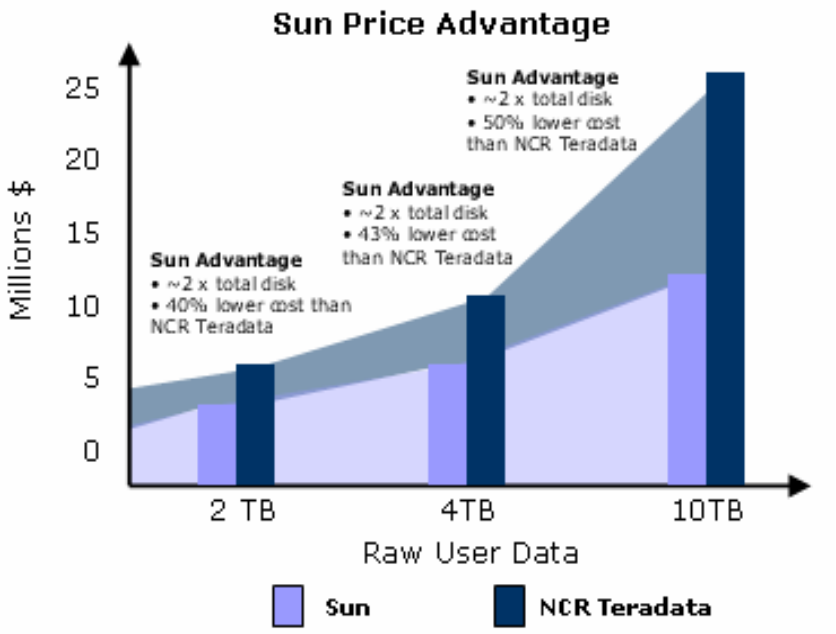



**Figure 5: Sun Price Advantage**

Achieving the lowest TCO for your organization is a challenge. Sun Microsystems has spent significant time to ensure you reach the full potential of your investment and that you operate in an open computing environment. You can leverage a standard set of skills and existing investments by standardizing on similar hardware and software technologies. This can further reduce costs beyond those detailed in this white paper. The focus on reducing the cost of computing and utilizing its reference architecture for interconnecting your systems is one of the significant advantages Sun delivers.

# Conclusion

The strategies you adopt to implement and manage your data warehouse systems represent opportunities for addressing TCO. Managing large volumes of data in an enterprise IT system is part of daily operations, but the question you must ask is how well you are managing your data warehousing costs.

Unfortunately most organizations do not leverage best practices and industry knowledge to determine TCO. It is critical that you analyze your environment and existing projects so you can potentially save millions in data warehouse costs. This white paper revealed a significant different approach to pricing on software and hardware that had large implications to your data warehouse budget. If you wish to save millions of dollars and build a cost effective enterprise, Sun is a viable technology provider.

Our analysis reveals that Sun provides a direct advantage in cost savings over NCR Teradata in each TCO category.

| Summary | Sun | NCR Teradata |
|---|---|---|
| **Software** | X | |
| **Hardware** | X | |
| **Personnel** | X | |
| **Total** | X | |

**Figure 6: Sun versus Teradata Cost Advantage**

You can reduce hidden expenditures as well as operational and financial risk in your data warehouse and IT portfolio. In addition, you can eliminate barriers and gain insight into data warehouse lifecycle costs and support a budget-based approach to managing your data warehouse investment.

Calculating TCO is critical to attaining such insight, but it requires knowledge on how to apply the investment for maximum benefit in your organization. While we focused our research on reducing costs, there are additional benefits you can realize in any enterprise data warehouse environment. While each technology supplier will market its benefits, the reality is that achieving the benefits are all about your ability to connect technology like data warehousing to your business.

This data warehouse TCO advantage boils down to managing your existing and future costs for technology and people. You shop based on price for all manner of products and services; it should be no different with your data warehouse investments. Utilizing TCO can be an effective method in saving you millions of dollars for your terabyte data warehouse while attaining the benefits required for your business.

# About Ventana Research

Ventana Research is the preeminent Performance Management research and advisory services firm helping our clients leverage technology and business processes to improve efficiency and effectiveness throughout their organizations.

Putting research in an IT *and* business context we provide insight and education on the best practices, methodologies and technologies enabling our clients to leverage assets to understand, optimize and align strategies and processes to meet their goals and objectives.

Ventana Research clients benefit from our focused research framework for complete business and technology coverage in Performance Management. Other research firms suffer from the inability to sustain their wide-ranging breadth of research (trying to cover too much) and by only putting research in a technology context. Our focus on the practice of Performance Management to maximize stakeholder value gives our clients actionable research in the appropriate context. We not only give business and IT managers the information they need, we bring them together to achieve Performance Management – leveraging assets to understand, optimize and align strategies and processes to increase profitability.

**IT *and* Business Perspective**
Ventana Research is the only Performance Management research and advisory services firm focused on aligning business requirements with information technology helping our clients optimize business processes to increase profitability. Here are the business and technology areas that our analysts and research cover:

**Business Research:**
Business and Operational Performance
Customer Intelligence & Demand Chain Performance
Financial Performance
Supplier Intelligence & Supply Chain Performance
Workforce Performance

**Technology Research:**
Business Intelligence & Data Warehousing
Business Process Management
Integration Management

**Performance Management Research and Advisory Services**
Ventana Research offers a wide range of services including:

- Performance Planning Advisory Services
- Performance Management Consulting Services
- Primary Research Studies

Please contact Ventana Research at clientservices@ventanaresearch.com to learn more about our services to help you embark on, or better execute on Performance Management Initiatives to improve the efficiency and effectiveness of your organization.