

## Defining Gartner Total Cost of Ownership

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Gartner TCO is a consistent, industry-standard way of assessing IT costs. Given tighter financial controls and increasingly expanding IT influence, TCO analysis is more critical than ever. Thus, it's important to distill TCO into its elemental parts and define it at its fundamental level.

## TABLE OF CONTENTS

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Analysis .....	3
1.0 What Is TCO? .....	3
2.0 Origin of TCO .....	3
3.0 Definition of TCO .....	3
4.0 Mandatory Elements Required to Create a TCO Assessment.....	4
5.0 Optional Elements to Improve a TCO Simulation .....	5
5.1 Complexity Module .....	6
5.2 Best-Practice Module .....	8
5.3 Worker Type Profile Module.....	8
5.4 Zeroing Indirect Costs .....	8
6.0 Who Should Use TCO .....	9
7.0 How IT Users Utilize TCO .....	9
7.1 Comparing Costs to a Baseline.....	9
7.2 What-If Scenarios Before Implementation.....	9
7.3 Understanding Future Costs .....	9
8.0 How IT Vendors Utilize TCO .....	10
9.0 Conclusion.....	10
Recommended Reading.....	10

## LIST OF FIGURES

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Figure 1. Illustration of Complexity Impact on Distributed Computing TCO Simulations .....	7
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## ANALYSIS

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### 1.0 What Is TCO?

Gartner TCO (total cost of ownership) is recognized as the industry-standard method for the financial analysis of IT and other enterprise costs. In the face of tighter financial controls and increasingly expanding IT influence, TCO analysis is more important than ever. It's been adopted by industry-leading IT providers, users and industry analysts.

### 2.0 Origin of TCO

In 1986, the decentralization of computing power was in full effect. One repercussion was that the cost of computing was no longer contained in the data center or the IT budget, which led to inadequate accounting for end-user costs, such as training and downtime. In 1986, Gartner published its first analysis of the lack of accountability for IT costs, and this "life cycle cost of PCs" research evolved into today's TCO research methodology as well as associated publications and products. Today, the consistent approach that Gartner TCO offers is recognized as the industry-standard method for the financial analysis of IT and other IT-related enterprise costs. This document definitively states the principles of TCO, its component parts and its practical applications.

### 3.0 Definition of TCO

*Total cost of ownership is the holistic view of costs across enterprise boundaries over time.*

Over the years, the definition of TCO has evolved. For example, it now includes non-IT costs that have a relationship with IT. These costs include HR, facilities and other enterprise costs that can change, due to IT initiatives such as mobility, process automation, outsourcing and virtualization.

The following section deconstructs the definition of TCO to gain further insight into how this powerful concept can be applied.

*"Total"* expresses completeness of accounting within the domain that's being assessed. Nothing that should be included is left out, but there must be no double-counting or overlap in cost elements. Thus, Gartner TCO is based on a "chart of accounts" that lists all of the cost elements taken into consideration.

*"Cost"* is the allocation of money for hardware and software asset acquisition, labor costs, fees for services, or cost for lack of a service (for example, downtime — see Note 1). The cost is further broken down into "direct cost" and "indirect cost":

- A *direct cost* item can be positively traced to an accounting line item, a purchase order, accounts payable, a payroll or a budget line item.
- An *indirect cost* item is defined as resources assigned to different cost centers that are performing functions composed of a line item in the TCO chart of accounts. For example, if a marketing employee is providing IT technical support to another associate, then the cost of the marketing employee's time to diagnose, troubleshoot and resolve that IT issue should be allocated to the "peer support" line item within the TCO chart of accounts.

*"Ownership"* expresses the asset-based philosophy of Gartner's TCO approach. All costs in TCO are embedded in "IT assets," which include IT and the people using it, all of which are owned by

the enterprise. For example, TCO can be expressed as the total cost of a Windows PC, a Unix server, a structured task worker or a knowledge worker.

"*Holistic view*" means that IT costs aren't entirely contained within the IT budget, and are dispersing further as IT permeates the fabric of business and personal life. Gartner TCO explores every part of the enterprise to account for time and money spent on specific IT-related activities, based on the principle that if these costs aren't *measured*, then they can't be *managed*. For example, when considering training, several perspectives on cost should be taken into account, including:

- Has the cost of IT training been accounted for?
- Do IT training costs include everything — for example, cost of the trainer, time of the trainees, room hire, audiovisual equipment and fees to a service provider?
- How should the cost of *not* providing training be accounted for?

"*Enterprise boundaries*" expands the concept of a holistic view to include the explicit determination of where costs move when they leave the IT cost center, because IT costs usually increase when they're dispersed across the enterprise. Another implication of enterprise boundaries is that IT costs are often affected by external factors, such as supply chain, customer demands, government regulation and the economy.

"*Over time*" refers to the life cycle perspective of TCO, because the cost of assets changes over time. There are front-end costs, such as procurement and training, and back-end costs, such as replacements, upgrades, retirement and disposal. TCO is expressed as an annualized steady-state cost in which multiyear investments are amortized (divided by their depreciation period) into one-year allocations (labor costs, by their nature, are annual costs). Large projects that create an interruption in the steady-state operations are best treated as separate cost analyses. These are key reasons why TCO and budgets aren't the same.

## 4.0 Mandatory Elements Required to Create a TCO Assessment

Regardless of the objective of the analysis, several mandatory elements must be included for the analysis to qualify as a Gartner TCO:

- Identify the domain or activity for which an annual TCO is required (for example, distributed computing, telecommunications or data center), or to make a specific decision, such as, "Will server consolidation really save us money?"
- Develop a chart of accounts, which is a list of cost elements that refers to TCO as defined above. For IT costs, this must include or evaluate the following:
  - Direct cost elements relating to assets or activities that are relevant to the analysis; for example:
    - Client, server, storage and all peripheral hardware costs
    - Software and related support costs
    - Maintenance and development costs
    - Networking and communications costs
    - IT operations and support costs
    - Associated IT management and administrative costs

- Associated indirect cost elements — for example, labor costs associated with the end user's use of an asset or activity, and any subsequent downtime involved.
- Ensure that the chart of accounts contains cost elements that satisfy the TCO definition's criteria for "holistic view" and "enterprise boundaries" — that is, taking a wider view of costs than normally occurs. Rather than simply being concerned about identifying and listing the costs within a specific function or department, the chart of accounts must also contain cost elements or cost categories that could be affected by activities or changes in the domain. For example, the chart of accounts for a help desk TCO may include cost elements outside of IT operations or IT support. Limiting the chart of accounts to cost elements only contained within IT operations is misleading, because help desk users incur a cost in the form of time spent and, thus, opportunity lost. Indirect costs may be associated with other departmental budgets, but they are still part of a properly constructed TCO. It's easy to turn a blind eye to such costs — for example, assuming that they're too small to be relevant, while ignoring the multiplication factor caused by the many individuals who are involved.
- Review the chart of accounts to ensure that all of its elements represent an *annualized* view of the TCO in question. The chart of accounts should contain details on critical affecting factors (such as depreciation periods) because these will significantly affect any annualized view.
- Review all chart-of-accounts elements to ensure that critical cost elements have been included and don't overlap, thus avoiding double counting.
- Collect and validate information regarding the costs and other data required to populate the chart of accounts. Use the enterprise's financial management system, asset management system and HR records to detail unit costs, and use survey questionnaires to establish people's use of time.
- Amortize all cost elements in the chart of accounts during a specified time period (such as annual, quarterly and so on). For example, a server with a three-year depreciation period would be included in the chart of accounts as one-third of the total server cost.

## 5.0 Optional Elements to Improve a TCO Simulation

"What if" scenarios with estimated costs provide a "quick snapshot" of the TCO profile. The preceding section identified mandatory elements required to establish a TCO assessment, but for simulation purposes, it's possible to populate the cost elements of the chart of accounts partly or entirely with estimated costs. For example, rather than specifying the precise cost of a print server asset, the average cost for such an asset may be used to give a less-accurate but faster appraisal of TCO in a particular what-if scenario. Provided that the source of the estimates is documented with any relevant reasoning, this will provide a TCO simulation that can be used to compare different technologies or solutions.

For simulation purposes, Gartner TCO acknowledges some optional, additional elements or modules for consideration. These may be used in TCO environments containing estimated data, or, at the other end of the scale, used with fully accurate chart-of-accounts data to deal with indirect costs that are otherwise difficult to quantify.

The following are additional elements for consideration:

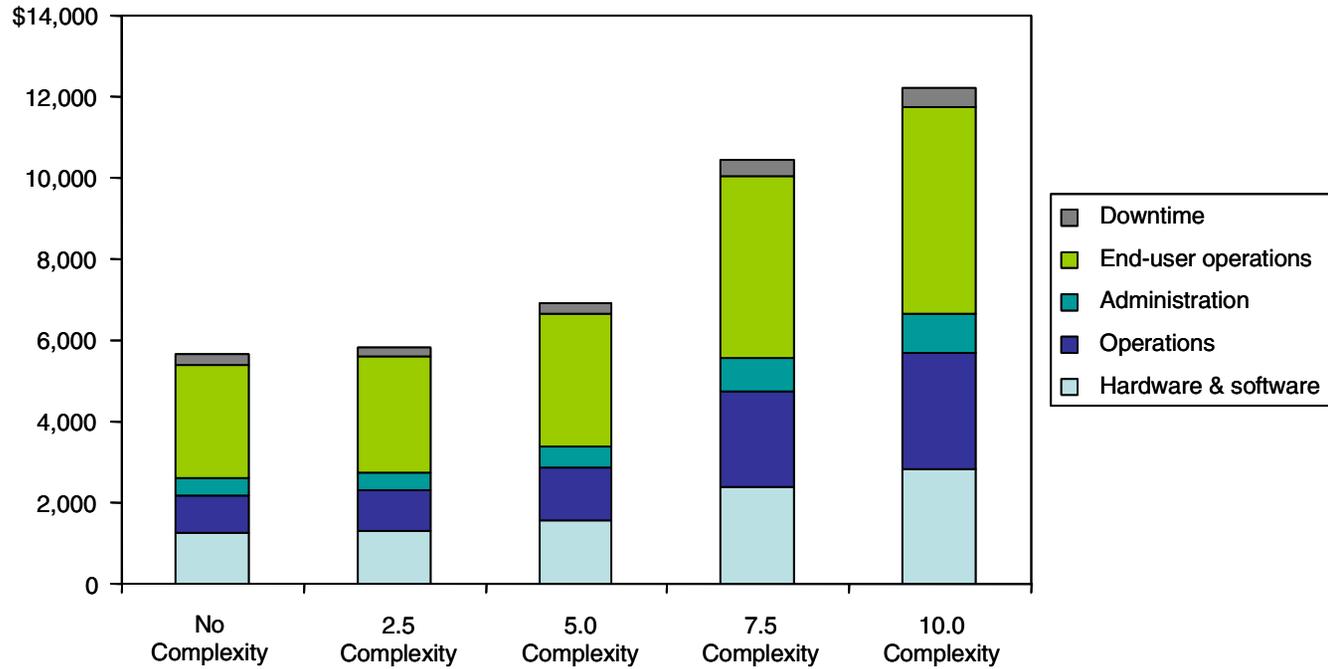
## 5.1 Complexity Module

This module helps users to quickly establish a complexity profile for their simulation via a series of questions that each have relative weightings to assess the complexity of the IT and business environment. The answers are used to adjust the original TCO baseline calculation up or down.

Recognizing that many users want to create what-if scenarios and simulations that approximate their own environment as much as possible, the "complexity module" provides this facility. TCO is likely to be higher in a complex environment. For example, an environment that has many different types of users in multiple locations, time zones and languages, and uses different computing platforms and software images, would be a complex and, therefore, high-TCO scenario. Conversely, an environment with only one user type, such as call center operators with little or no geographic spread and a single, standard technology platform, would be a simple and, therefore, lower-TCO scenario.

A complexity score index is first created by assessing the degrees of complexity established in the system that's being evaluated. This complexity score index is used to create a "complexity scalar," which adjusts the calculated TCO estimate up or down. A complexity score index of 5 represents an average complexity, and no adjustment is applied. With an overall complexity score index of 4, the complexity scalar would adjust the TCO downward by 20 percent, whereas an index score of 5.5 would raise the simulated TCO by 25 percent (see Figure 1). For additional information, see "Control Distributed Computing TCO by Keeping an Eye on Complexity Creep."

**Figure 1. Illustration of Complexity Impact on Distributed Computing TCO Simulations**



Source: Gartner (December 2005)

## 5.2 Best-Practice Module

This covers the simulated impact on TCO through the adoption of best practices, and is conducted through a series of weighted questions to assess how much "best practice" is in use. Again, the answers will adjust the original TCO baseline.

TCO is likely to vary, not only due to complexity, but also based on how effectively an enterprise performs a series of activities — for example, change and operational management; asset management; technology planning and process management; customer service and training; or through process and policy and via the use of tools.

To enable users to better simulate and model their environments as accurately as possible, they can use answers to a series of best-practice questions to adjust the final simulated TCO number in a similar way to the complexity adjustment described above. Because the specific TCO adjustment percentage range varies from one best practice to the next, let's use a "change management" best practice as an illustration. Let's assume that change management comprises activities around deployment; retirements and moves; and change management technology and processes. Recognizing the positive TCO impact of best practices for change management, a change management "best-practice scalar" will adjust the original TCO number up or down according to the best-practice index score obtained. Best practice change management can reduce TCO more than 6 percent compared with organizations in which best practice change management isn't in place.

## 5.3 Worker Type Profile Module

This module enables users to simulate their own environments as closely as possible by including a definition of different worker types. Different work roles imply different usage patterns and associated costs. Gartner has defined four types of business workers:

- *Data entry worker:* This individual is primarily responsible for transcribing information from one medium to another. The job is computer-intensive and downtime-sensitive, but will also likely have the lowest costs. Typically, this user interacts with corporate database applications.
- *Structured task worker:* This individual primarily works within a business process. The work includes repetitive tasks that add some value to a process chain. This worker uses enterprise business applications, such as claims processing.
- *Knowledge worker:* This individual works in ad hoc or project mode. The work entails gathering information and adding value to it in support of a business decision. This worker primarily uses personal productivity technology tools.
- *High-performance worker:* This individual works in a computer-intensive project mode. The environment is typically graphics- or media-intensive technology. Typically, these are specialized applications (such as design or analytics) running on high-performance workstations, and these users are the most expensive to support.

## 5.4 Zeroing Indirect Costs

If the TCO impact of certain indirect costs is regarded as negligible or tangential to the main focus of the cost management exercise, then the indirect cost elements in the chart of accounts may optionally contain zero costs. Each line item should remain as an indication that it's been acknowledged but deliberately excluded; otherwise, it isn't a Gartner TCO model. Although this removes the "holistic view" of the analysis, it may be more appropriate in some situations. For example, if a TCO for a data center were to be created, there may not be much point in including

end-user costs because users wouldn't normally have direct contact with the data center. Any user issues would be handled by a help desk or support function, and would never be directly associated with the data center. However, managers should realize that if they eliminated all end-user support and help desks, then direct costs would naturally decline, while indirect costs would skyrocket as users spent time and money assisting one another. Sometimes, lower costs aren't a good thing, and businesses may be trading lower direct costs for a huge increase in lost user productivity.

## 6.0 Who Should Use TCO

Anyone who wants to understand the cost profile of a specific environment, user or asset type will benefit from applying TCO to their situation. For example:

- *IT managers or CIOs* seeking the lowest-cost IT solution to a specific problem should use TCO as a rigorous analysis of different options.
- *CFOs* should ask for an overview of the TCO analysis that's been performed to confirm that the most cost-effective solution has been proposed.
- *Procurement managers* should review the TCO analysis performed by IT (at least in overview), rather than choosing what appears to be the least expensive solution.
- *Contract negotiators* should employ TCO in contracts so that they can take vendors to task if the promised benefits don't materialize.
- *Vendor marketing managers* should use TCO in their brochures to prove that their solution is the most cost-effective.
- *Vendor sales* should employ TCO arguments as per the marketing literature provided.

These job functions can be grouped into *IT users* and *IT vendors*. The following two sections clarify the application of TCO by these two groups.

## 7.0 How IT Users Utilize TCO

### 7.1 Comparing Costs to a Baseline

Many enterprises conduct TCO benchmarks to capture the precise TCO profile at any given time with the technologies and people they have in place. As soon as a baseline TCO has been established, it may be used for internal or external comparisons, or tracked quarterly in scorecards and dashboards.

### 7.2 What-If Scenarios Before Implementation

Using Gartner research or Gartner Applied Methodology Tools, many users also apply TCO to their technology planning by creating different scenarios and by simulating their respective TCO in different conditions. This enables them to be better prepared to develop the business case, or to move forward into actual implementation.

### 7.3 Understanding Future Costs

As mentioned in the beginning, Gartner analysts initially coined "TCO" because they sought to develop a methodology that would enable a better view of computing costs, because traditional cost models built around the data center didn't adequately capture end-user costs such as training or peer support. Over the years, analysts have used TCO to publish their latest estimates for costs of various technologies and platforms (either available or about to become available in

the market) and, thus, have assisted users in understanding the TCO implications of such solutions. Because the definitions and charts of accounts are standard, users that already take a TCO view of their costs can use Gartner analyst estimates to get a clearer impression of what the future might cost in relation to the TCO they already have.

To illustrate the value of this, many enterprises face the choice between "thin clients" (minimal desktops) and "fat clients" (fully configured desktops). Most enterprises believe that hardware and software costs on the user's desktop could be lowered through the use of thin clients, but few conduct a full evaluation of how costs that are pushed from the desktop migrate elsewhere. With thin clients, network and server availability is more important, pushing up networking and technical service costs. Costs go down in one TCO cost category and up in another. Thus, the choice between thin and fat clients is less clear-cut than it seemed to be at the onset.

## 8.0 How IT Vendors Utilize TCO

Because IT vendors also use the language of TCO to discuss their product and service offerings, buyers have found a way to turn this to their advantage. If a vendor has identified its TCO benefits in a marketing brochure, then those arguments should be relatively easy to map onto the TCO profile and analysis of a user organization. This gives the enterprise user an opportunity to hold the vendor accountable. Over the years, Gartner has viewed many situations in which specific "TCO milestones" have been negotiated, and bonuses and penalties have been constructed around them.

Thus, IT vendors compose another large TCO user constituency. All vendors want to present their products and services in the clearest possible way so that their attributes can be identified and understood by as many users as possible.

## 9.0 Conclusion

The principles of TCO provide critical insight into the dynamics of enterprise cost economics. These dynamics include how costs shift from one domain to another, the impact of new technologies and practices, and the importance of people in IT cost analysis. Gartner continues to encourage clients to build these TCO principles into their business cases and buying plans, and encourage IT providers to integrate TCO into their product planning and marketing strategies. TCO is a critical, basic building block in any business decision that involves IT or IT-related costs.

### RECOMMENDED READING

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"Control Distributed Computing TCO by Keeping an Eye on Complexity Creep"

"PC TCO Revised for Longer Life and New Technologies"

"Avoid the Most Common E-Service Implementation Problem: Lack of TCO Planning"

"Total Cost of Ownership as a Common Denominator"

"How to Use IT Cost Metrics Effectively"

"Market Focus: Client PC Total Cost of Ownership, Mexico, 2005"

### Note 1 Downtime

Downtime calculates the impact of system unavailability on the end user's productivity. A system outage will affect a percentage of users that may or may not be able to perform other tasks. The

fully burdened hourly rate of those users is the cost of downtime. Note that TCO doesn't look at lost opportunity or process interruption costs because there's a high degree of variability in those calculations. Clients should calculate those costs as specific incidents dictate.

This research is part of a set of related research pieces. See "Use Processes and Tools to Reduce TCO for PCs, 2005-2006 Update" for an overview.

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