

4.2.5.2 Manageability Costs

[Return to the Manageability](#)

About

[Return to Top](#)

It is no longer necessary to argue that managing enterprise computing systems is complex and time-consuming, or that the cost of managing Information Technology (IT) infrastructures far exceeds the hardware and software costs—numbers speak for themselves: IT operations account for 50%-80% of today's IT budgets, amounting to tens of billions of dollars yearly. Besides the bottom line, poor manageability also impacts reliability, availability, and security in harder-to-quantify ways. As human error becomes the dominant cause of unscheduled [downtime](#), we desire systems that are easier, cheaper, and quicker to manage.¹⁾

The cost of managing systems is expensive and is getting more expensive. This is particularly true when using [servers](#) that are aging. The cost of support and administration of a new server is about \$4,200/year; by year seven, the cost will rise to about \$17,000/year. It is logical to try and decrease these costs through refreshing the hardware¹⁾.

Year-to-Year Changes in Relative Server Performance for Invested Costs

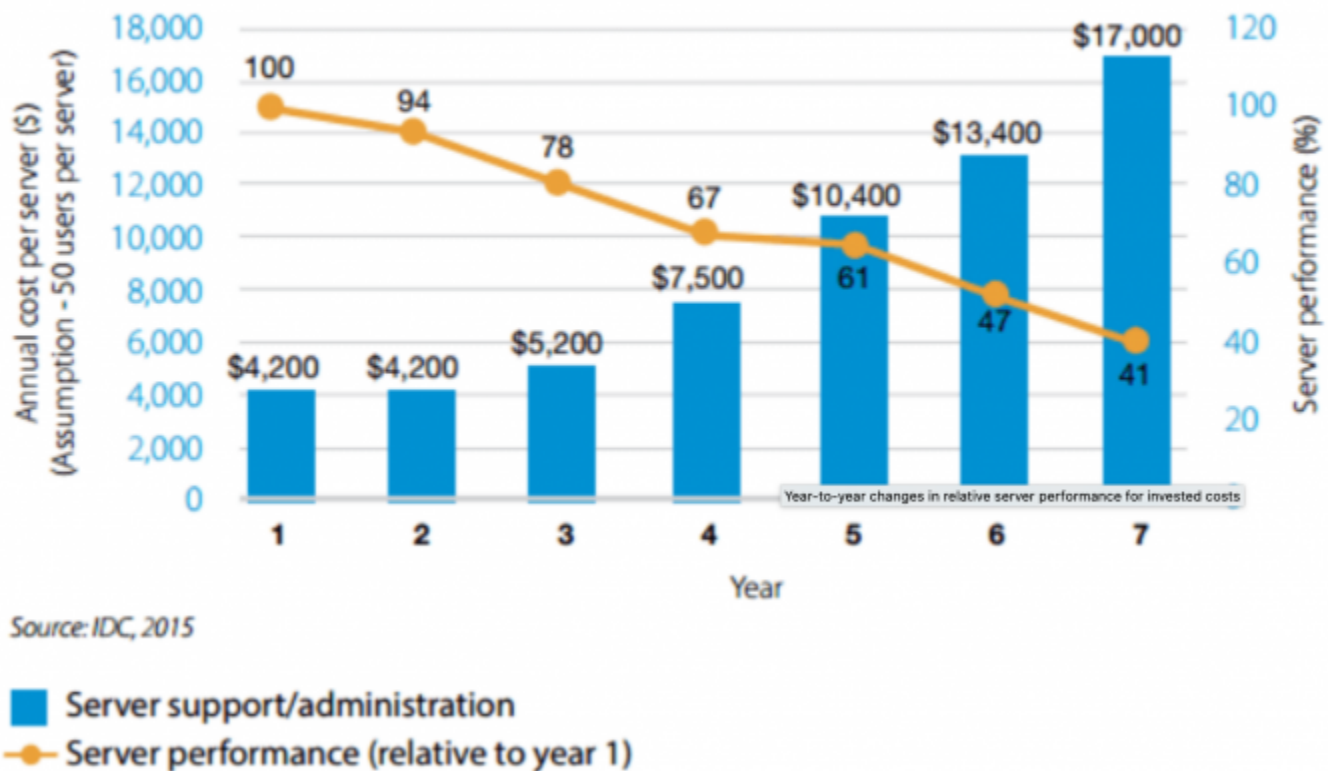


Figure 1: Year-to-Tear Changes in Relative Server Costs

Although these are the costs of owning and operating physical servers, the trend is relevant to almost all IT systems including software. The costs of managing the software is analogous to maintenance of the hardware but is probably worse since application software is dependent on many more layers of hardware and software. For example, a software system sitting on multiple Operating Systems (i.e., Linux, Unix, Windows, MacOS, IOS and Android), using a [DataBase Management System \(DBMS\)](#), a Web Server and using Java, Python, JavaScript, HTML, CSS, and supporting multiple browser (i.e., Firefox, Chrome and Safari) soon is overwhelmed by just keeping each system up-to-date and working. Distributed systems can compound that problem because each node in the System Network needs to be managed as well.

Granted, there are products and tools that can reduce the complexity of managing the various platforms easier and this is a big step towards helping manageability. But the overall [goal](#) is always to have systems that are easier, cheaper, and quicker to manage. There is another way to think about manageability called the Bathtub Curve. Although Figure 2 is targeted at hardware, there are similar things that effect software. Probably one of the biggest problems is that as the number of components in the system increase, the number of [End-of-life \(EoL\)](#) or [End of Sales\(EoS\)](#) issues need to be addressed. For example, a system that runs on an Operating System, has to worry about the EoL of the operating system. If it uses a database, it has a similar problem. These are generally not a problem in the early stags of the a system's lifecycle and hopefully of minimum problem during its "useful Life" phase. But as the system ages, more and more EoL problems arise. The more [Commercial Off-The-Shelf \(COTS\)](#), [Government Off-The-Shelf \(GOTS\)](#), [Modified Off-The-Shelf \(MOTS\)](#), and [NATO Off-The-Shelf \(NOTS\)](#)

products used by the system, the longer the system exists there is an increase in risk to the system because each subsystem, component or modular need to be managed.

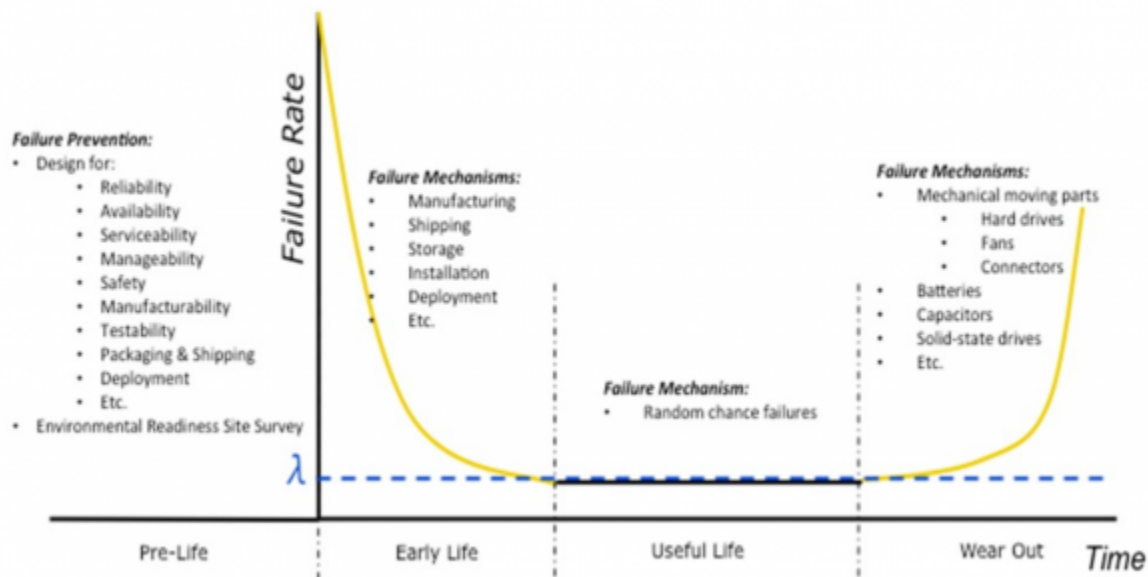


Figure 2: The Bathtub Curve ¹⁾

DIDO Specifics

[Return to Top](#)

☐ TBD

¹⁾

[The Hidden Costs of your aging IT Infrastructure](https://blog.juriba.com/the-hidden-costs-of-an-aging-it-infrastructure), Barry Angell, 9 January 2017, accessed 15 July 2020, <https://blog.juriba.com/the-hidden-costs-of-an-aging-it-infrastructure>

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