

# THE ROI STORY

A GUIDE FOR IT LEADERS

**STEVEN KAPLAN**

FOREWORD BY MARK TEMPLETON

# FOREWORD

By Mark Templeton

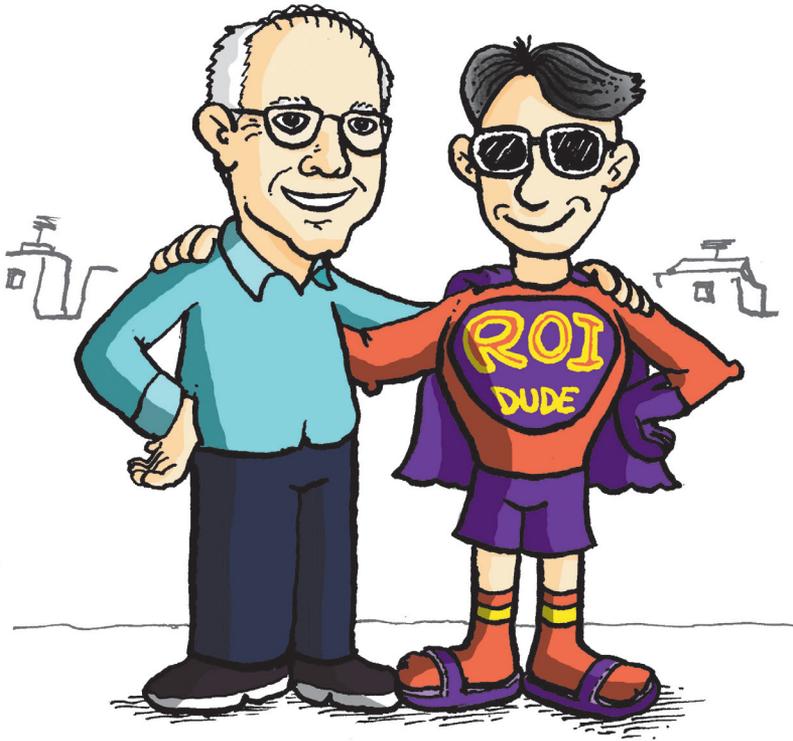
I met Steve Kaplan for the first time at our inaugural Citrix partner and customer event – Citrix Thinergy – in 1998. When I met Steve, I discovered his Citrix partner company had also been a reseller partner for my prior software company, Keyfile document imaging software, where I was Vice President of Marketing. Compared to selling Citrix, selling document imaging was like pushing rope. We had a great laugh and began a long-time journey together – in service to customers.

I have been in a leadership role at five technology companies during my career, all of which have offered solutions that questioned and disrupted the status quo. A passion for innovation, however, makes it easy to forget that potential customers who do not eat, drink, and sleep the technology daily may not immediately grasp its full potential. Pioneers and disruptors face significant challenges when it comes to helping customers evaluate the potential of disruptive innovation over established legacy solutions. One of the most tried-and-true ways to do this is through a comprehensive ROI framework that quantifies the advantages of doing something new.

We saw this at Citrix when we co-sponsored Gartner Group’s original “TCO” research in the mid-90’s. Steve’s channel partner firm took it even further with an ROI analysis that justified the business value to a centralized computing architecture. His approach was very effective, and it helped his business become Citrix’s first Partner of the Year. Steve has been a leading advocate of the ROI approach to IT decisioning, and he’s openly shared his methodologies with others – even competitors.

This foreword is the second one I’ve written for Steve. In 2000, I wrote the foreword for his first book, which was about Citrix MetaFrame, and included an innovative thought leadership chapter on ROI. While the IT industry has evolved tremendously in the intervening 18 years, the

disciplined process of financially-modeled decision-making has become a best practice. This book reflects Steve's many years of financial modeling experience across multiple industry segments. It should prove useful to anyone wanting to evaluate and justify disruptive technology.



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# PREFACE

## The ROI Story: A Guide for IT Leaders

Once in 1999, I was having breakfast with Citrix CEO Mark Templeton and he asked me, “How are you selling so much Citrix?” At the time, I ran a Citrix channel partner business, RYNO Technology, that was tucked away in a small city in the north San Francisco east bay. I replied simply, “We use ROI.”

Although ROI and TCO analyses were scarce when I started out in the IT business, they are commonplace now. Unfortunately, manufacturers typically shroud them in mystery and fail to provide sufficient foundation for their conclusions. The analyses tend to be generic in nature, filled with marketing speak, and presented by sales reps. Consequently, IT staff sometimes eschew the whole idea of financial analysis.

However, a customized and rigorous financial modeling engagement can be very valuable to an IT organization. It is particularly useful when evaluating disruptive infrastructures such as hyperconverged or public cloud. But even after two decades of evangelizing the importance of financial analysis, I still see many IT folks either ignore it entirely or fail to incorporate all the relevant variables demanded by today’s complex architectural options. We had a situation not long ago where a county CIO was so set on going to public cloud that he refused a no-obligation TCO analysis engagement. He preferred not to know the numbers.

# THIS BOOK

I've co-authored five books on Citrix and VMware technologies over the years. This is my first solo effort, and it's a heck of a lot harder without my brilliant co-authors. But at least I have a battle-tested perspective in financial analysis that goes vastly deeper than what I picked up as part of my MBA at Kellogg long ago. I've championed financial analysis at my own companies, the companies that bought my companies, and at Nutanix. During the past eight months, people would sometimes ask, "How long have you been working on your book?"

**"My entire IT career."**

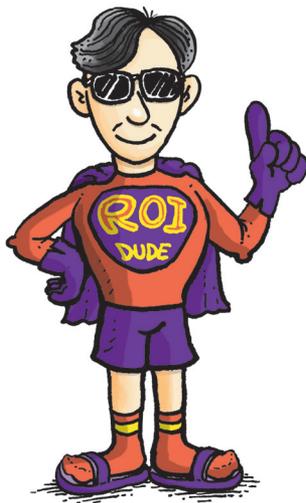
While a little tongue-in-cheek, there is also a lot of truth in my answer. This book represents almost 25 years of experience just bursting to get out. Like countless decisions, even major decisions, that so many of us make - I did not bother doing an ROI analysis evaluating the effort vs. projected results. It is a work of passion rather than economic reward.

The goal of this book is to assist CIOs, CTOs, CFOs, IT managers, IT staff, channel partners, manufacturers, consultants, cloud providers, systems integrators, outsourcers, and anyone else interested in how to use financial analysis as a framework to optimize strategic decision-making. It is geared toward evaluating and building a corresponding business case for disruptive infrastructure technologies, and focuses on Nutanix's HCI-based solution, what we call enterprise cloud, though the methodologies should prove helpful for analyzing any platform.

One final note - my first stab at this book read more as a huge, very dry, whitepaper. As I was hiking the Lake Tahoe trails one evening, I was thinking about the book, and it occurred to me that a good financial analysis tells a story - and this book should do the same for hyperconverged infrastructure. I rewrote it from more of a personal perspective, including anecdotes from my own experience along with other analysts on my Customer Success Finance team at Nutanix.

And speaking of personal experiences, when my first channel partner business, RYNO, made the commitment to go “all in” with Citrix, I wrote a comic book to help explain the technology. It was called, “RYNOman and the MetaFrame Adventure.” I sent a copy of the comic book to Mark Templeton - whom I had never met, and who was away at the time. He later told me that his admin opened his mail and read the book. When he returned, she told him, “Now I finally understand what we do.”

So, in that spirit I’d like to introduce, ROI Dude. ROI Dude is a geeky, awkward financial hero who leaves tips now and then for readers throughout the book. I suppose he is also my alter-ego given my Twitter handle of @ROI dude. If you are so inclined, feel free to follow me there for continued ROI (and other) stories.



It sounds funny to say “enjoy” when referring to reading a book about financial analysis – but I hope that you do just the same.

**Disclaimer:** The views expressed in this book are those of the author and not necessarily those of Nutanix, Inc. or any of its other employees or affiliates.

# INTRODUCTION

## What is an ROI Story?

The phrase “financial storytelling” tends to conjure up images of Enron-like book-cooking. The storytelling I advocate is not fiction, nor is it designed to mislead in any way. It’s taking what appears to be a rather dry spreadsheet and imbuing it with emotion. This doesn’t mean an analysis is without bias – quite the contrary as discussed in Chapter 7 on Ethos (credibility). But a spreadsheet alone, regardless of how impressive the numbers may be, is often not enough to shift IT from a legacy mindset, or alternatively to resist what can be intense pressure to lift and shift everything to public cloud. The objective of telling a story is to evoke a reaction from an audience. With an ROI story, the ultimate intent should be to both educate and captivate the decision-makers to the point where they are galvanized to act.

## Disruptive Times

Disruptive IT infrastructure has been the norm over the decades, rather than the exception. Still, we have never seen a time such as now. The traditional hardware-defined datacenter model is besieged on multiple fronts. On one side is the public cloud, which continues to grow ever more popular. On the other side is software-defined infrastructure known as hyperconverged infrastructure (HCI), which is also growing extremely rapidly. Seemingly sandwiched in the middle is the hybrid combination of software-defined infrastructure on-premises with multiple public cloud options – known as multi-cloud.

As the multitude of on-premises, public cloud, and multi-cloud options continue to increase, it is more important than ever to have a financial analysis framework to optimize strategic IT purchase decisions. The ROI and TCO approaches commonplace today often are inadequate as they fail to keep up with the realities of technology. Evaluations of

public cloud options, for example, often fail to recognize the different categories of workloads and how they impact monthly charges. IT decision-makers commonly overlook costs such as specialized administration, data egress, and bandwidth. The pennies charged per hour can quickly add up to a \$200K monthly cloud provider bill.

Most ROI or TCO models also fail to consider the changing dynamics resulting from the fractional consumption of HCI. As an organization expands its HCI footprint, its averaged cost on a virtual machine (VM) basis continues to fall. The newer HCI nodes added to the cluster benefit from increased VM densities due to ever improving hardware and software technology. Most financial tools also fail to account for HCI's elimination of the (earlier than expected) forklift upgrade risk standard with traditional SANs.

Making a big IT purchase decision about legacy infrastructure, public cloud, or HCI does much more than impact an organization's cost structure; it affects the organization's ability to achieve its business objectives. Many organizations, for example, are striving to embrace digital transformation. Some are trying to lead their industry, while others are simply trying to survive. The lack of agility and scalability of legacy IT infrastructure makes it much more difficult to achieve a digital transformation initiative.

Choosing an infrastructure platform isn't just a question of minimizing IT costs – the future of the business depends upon it. Going through the rigors of a financial analysis helps IT leaders secure both the financial and political clout needed to justify disruptive infrastructure. The process also enhances the probability of a successful project. It furthermore provides a baseline against which IT leaders can measure their success so that they can show senior management the value they have provided for their organizations. This helps secure funding for additional initiatives.

This book is divided into two parts: Bringing Clarity with a Financial Analysis Framework, and Building a Compelling Financial Analysis story.

# PART I

## Bringing Clarity with a Financial Analysis Framework

In Part I, we talk about the gross inefficiencies of legacy infrastructure that have spawned the software-defined HCI and public cloud alternatives. Part I also describes a financial analysis framework to clarify the obfuscation surrounding IT infrastructure options. It emphasizes the current reality facing IT professionals today, that they must learn to speak the language of the business – finance. Accordingly, Part I concludes with a review of financial basics.

### Chapter 01

## The Power of a Financial Narrative

We begin by defining disruptive infrastructure and discussing why a handful of multi-billion-dollar incumbents dominated the datacenter for well over a decade. This chapter explains why even VMware's virtualization revolution was very slow to replace physical servers, and why telling a financial analysis story helps effect change. The chapter also gives a preview of the ethos, logos, and pathos persuasion framework first proposed by Aristotle 2,500 years ago.

### Chapter 02

## The Broken Hardware-Defined Legacy Datacenter

Here we talk about the challenges and frustrations of the legacy hardware-defined datacenter including shadow IT, technical debt, budgeting, and complacency. This chapter covers the components and limitations of “3-tier” legacy infrastructure and why so-called “converged infrastructure” made a big splash for several years.

## Chapter 03

### The Software-Defined Datacenter Alternatives

Digital transformation is impacting every industry. Software-defined infrastructure, whether on-premises HCI or public cloud, provides a means for IT to realize the agility required to meet the ever-increasing business demands for innovative services and offerings. This chapter discusses how HCI and public cloud are two sides of the same coin, and why a “cloud first” (meaning public cloud) policy is often not an optimal strategy.

## Chapter 04

### Using the Language of the Business to Rationalize IT Decision-Making

Chapter 4 emphasizes the dual biases plaguing rational IT decision-making: Status quo and public cloud. It discusses how finance, the language of business, can help mitigate these biases. The chapter covers the many objectives of a financial analysis and how it helps facilitate an IT partnership with the business. It concludes with a discussion of the transformational CIO.

## Chapter 05

### Finance Basics

Chapter 5 provides a refresher course in speaking the language of the business – finance. It reviews basics such as financial statements including income, balance sheet, and cash flow statements. It covers the main focus of the business along with popular ratios and financing options. We contrast ROI with TCO and explore different TCO models. The chapter also explains other popular financial terms such as IRR, NPV, WACC, and so on.

# PART II

## Building a Compelling Financial Analysis Story

Part II describes how to build a compelling financial analysis story. It begins with the analysis process, then dives into Aristotle's modes of persuasion: Ethos, logos, and pathos, and concludes with some examples of how an analyst can help to ensure customer success even after project approval.

### Chapter 06

#### The Analysis Process

The analysis process can vary widely depending upon such factors as the analyst's employer, analyst background, and the intended audience. This chapter covers the analysis scope, parameters, and different analysis categories our team uses. It discusses analysis preparation and the art of negotiating data inputs with the customer.

### Chapter 07

#### Ethos – The Importance of Establishing Credibility

A compelling ROI story depends upon trust. Trust requires establishing the credibility of both the analyst and of the analysis. This chapter discusses how to mitigate analyst bias and the challenge of disruptive infrastructure as part of building ethos. It includes a story about NetApp's approach to financial analysis established credibility.

### Chapter 08

#### Logos – The Numbers

This chapter covers data gathering, including negotiating with the folks providing the data. It provides suggestions on how to quantify

standard variables such as facilities costs, along with more challenging factors such as growth, administration, risk, downtime, and intangibles. It describes crunching the numbers including the number of HCI nodes required given different growth assumptions. It suggests approaches for comparing HCI vs. 3-Tier, other HCI and public cloud. The chapter includes examples of different spreadsheet-based TCO calculators our team has developed.

## Chapter 09

### Pathos – Crafting and Presenting the ROI Story

Here we cover how to imbue emotion into the analysis – including pictures, conflict, resolution, characters, and dialog. Chapter 9 provides some guidelines on presenting the story and tying the presentation to the audience. The chapter includes a story about a financial analysis engagement we did for a Fortune 25 company, and concludes with a 10-step storytelling framework by 11-time New York best-selling author, Don Yaeger.

## Chapter 10

### Helping to Ensure Customer Success

This chapter describes how a financial analysis can help ensure customer success after the project is approved. And who better to help ensure customer success than a Customer Success department? The chapter includes multiple customer examples where financial analysts worked in concert with the Customer Success organization to expand the enterprise cloud platform, introduce new beneficial offerings, build the partnership with the customer, restructure the IT organization, transition storage administrators to DevOps, and build a chargeback model. The chapter concludes with an exploration of IT as cost center vs. innovation center, and of how the later perspective requires new financial analysis approaches.

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# TIP 01

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*The purpose of IT is not to reduce the cost of IT.*

# 01

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## The Power of a Financial Narrative

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*“The ROI analysis helped us with tactical considerations such as deciding which platform to purchase and in developing an internal chargeback program. More importantly it provided context for our ongoing strategic planning for the many innovative projects we’ve been implementing at the County.”*

**Jon Walton**  
**CIO County of San Mateo**

An IT manager looking to replace a legacy disk-based SAN with an all-flash array can make her case to the CIO without elaborate financial justification. The newer unit will certainly be faster, more efficient, and likely easier to operate. But despite these improvements, the all-flash array is just a better version of her organization's existing equipment. The firm's operational practices won't change all that much, if at all, making the decision whether to buy or not easy to quantify.

In contrast, disruptive infrastructure technology such as hyper-converged tends to significantly complicate the buying decision. It forces new operational procedures and can impact IT governance, security, and compliance. It alters buying cycles and can conflict with traditional infrastructure budgeting. It may eliminate IT staffing positions. To achieve approval, this kind of disruption often necessitates extensive financial justification. But even favorable economics might not be enough to alter the ingrained processes, interests, and cultural norms surrounding the legacy environment. In many cases, it takes an ROI story.

## Disruptive Infrastructure

Clayton Christenson coined the term "disruptive innovation" which, when applied to IT infrastructure, implies a hardware or software platform for hosting applications that displaces the previous standard. Some examples over the decades include client/server, server-based computing, network attached storage, virtualization, containers, hyperconverged infrastructure, cloud, and multi-cloud. Of course, a countless variety of solutions touted as disruptive, such as Application Service Providers (ASPs), have fizzled out entirely.

## The Vicious Circle of Complexity

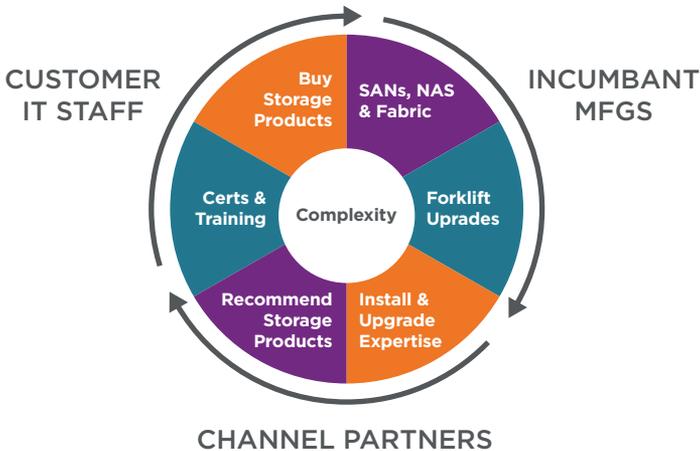
In 2012, both the CEO and Sales VP of a tiny start-up approached me about working for them. I saw a demonstration of their technology

and thought, “If this works - it would change the industry!” But then I thought, “How often does a 50-person company have a prayer against the handful of multi-billion-dollar giants that dominate the datacenter?” I foolishly didn’t join for an entire year by which time it became obvious even to me that the now 150-employee Nutanix was going to be successful despite the enormous opposition it faced.

And the opposition was indeed immense. A comfortable oligarchy of datacenter behemoths each sold billions of dollars annually of proprietary storage arrays known as Storage Area Networks – or SANs. The storage arrays required expensive forklift upgrades when they either ran out of capacity or when they reached the end of their useful lives, typically three to five years. Even worse, the storage products were complex. This complexity both increased the cost of running a datacenter and limited the ability of IT to adequately support the business. Yet this complexity is the very thing that helped the datacenter incumbents to maintain their dominant positions.

The proprietary storage arrays required both a switch fabric, such as fiber channel, to connect to the servers as well as a separate management pane. They required individual tools, backup and disaster recovery methodologies. Administrators underwent training and acquired certifications providing them not just a comfortable career path, but a unique status comparable to Oracle DBAs or IBM mainframe MIS folks.

## Vicious Circle of Complexity



Many channel partners grew their businesses by acquiring expertise in deploying and upgrading specific manufacturer storage offerings. They were able to charge their customers for professional services that often doubled the margin received from selling the storage products themselves. These same partners naturally promoted the offerings from their favored manufacturers.

The incumbents' stronghold made it difficult for innovative upstarts to break into the data center. Fusion-IO, for example, was an early user of the new flash technology. The firm was extremely well-funded and had Apple co-founder and industry icon, Steve Wozniak, as chief scientist. Despite an IPO of \$2B in June of 2011, SanDisk acquired Fusion-IO three years later in a \$1.1B fire sale. Another early flash provider, Violin Memory, fared even worse, filing for bankruptcy three years after its 2011 IPO. Tintri made it all the way to 2018 before filing for bankruptcy. The incumbents augmented their startup kill zones by acquiring companies showing signs of innovation such as Whiptail, Texas Memory Systems and Nimble Storage.

## Nutanix HCI

In 2012, while the incumbents were busy squelching the “faster/better/cheaper” upstarts, Nutanix quietly came onto the scene with an entirely new software-defined approach to IT infrastructure based upon the Google File System. Hyperconverged infrastructure, or HCI for short, replaced the need for proprietary arrays by making storage itself a software application running on commodity servers. As is true with public cloud, HCI (done right) breaks the vicious circle of complexity. Deployments take hours or minutes instead of the days or weeks common with legacy infrastructure. Forklift upgrades disappear, and scalability is as simple as adding a node to the cluster. HCI slashes administration by automating or eliminating every single storage task. An August 2018 [IDC study](#)<sup>1</sup> of Nutanix customers who migrated from legacy infrastructure reported a 61 percent decline in the IT time needed to deploy, manage and support Nutanix HCI.

Fortunately for HCI, not all channel partners retained an unwavering loyalty to the storage manufacturers. Many realized that continuing to promote complexity in the face of a much more efficient alternative eventually would negatively impact their businesses, and they increasingly incorporated HCI as their primary architectural recommendation. They moved up the value chain with offerings such as automation, analytics, and DevOps. They helped their clients build multi-cloud environments with optimal mixtures of on-premises and public cloud workloads.

The leading storage manufacturers, on the other hand, were much slower to recognize the viability of HCI – though today all of them offer one or more HCI solutions. They initially scoffed at the notion of hyperconvergence as suitable for running any type of significant datacenter applications. At best, they proclaimed it would perhaps be suitable for VDI or test/development. In an early 2015 Tweet, NetApp proclaimed, “HCI: The new hammer if all your world’s a nail.” NetApp now promotes its second attempt at an HCI solution.



**@NetApp** 20 Apr 2015

HCI: The new hammer if all your world's a nail  
[nt-ap.com/1H9CHeo](http://nt-ap.com/1H9CHeo) via [@mhardi01](https://twitter.com/mhardi01)

Dell was an exception. Even though the company manufactured both EqualLogic and Compellent SANs, it recognized the potential for HCI to turn the storage industry on its head. I don't know if Dell first approached Nutanix about a joint HCI solution or if it was the other way around, but I do recall how important such a deal could be not just for Nutanix as a start-up, but for validating the entire HCI industry.

After months of deliberation, Dell decided to enter the market by selling its own HCI solution, Dell XC, which packaged Nutanix software on Dell servers. While not directly involved in the negotiations, I had an opportunity to meet with a couple of Dell representatives in early 2014 as the two parties were finalizing the OEM partnership. One of the topics we discussed was San Mateo County's decision to purchase Nutanix HCI instead of continuing with their traditional Dell servers and mixture of Dell and NetApp storage arrays. Upon learning that I had provided a financial analysis for the county comparing Nutanix HCI vs. legacy infrastructure, one of the Dell executives told me, "You know - the fact that Nutanix was able to unseat Dell from our long-term position at the county played a part in our decision to partner with Nutanix."

While pleased with Dell's revelation, I wasn't surprised. I'd already spent 20 years using financial analysis to help IT leaders quantify the value of disruptive infrastructure technology. In the eight years prior to joining Nutanix, I spent most of my time analyzing and justifying perhaps the most disruptive infrastructure technology to ever hit the datacenter, VMware virtualization.

## VMware's Impact on the Data Center

VMware virtualization enabled organizations across the globe to convert their physical servers into virtual machines (i.e. software). It also shifted the data center standard from direct-attached to shared storage (i.e. SANs). The shift to centralized storage can be traced to VMware's introduction of VMware vMotion on November 14, 2003. The vCenter 1.0 User manual included four bullet points on page 37 specifying the requirements for running vMotion. The first one read, "The hosts must share a storage area network (SAN) infrastructure." Organizations across the globe wanted to run vMotion, and they began purchasing SANs in a big way. After three years of declining sales at both EMC and NetApp, revenues shot up.

If you weren't working in IT in those days, it's hard to grasp the impact of vMotion. It was like magic. Most (seasoned) IT folks today can still remember the circumstances of what they were doing when they first saw a vMotion demonstration. In my case, it was early 2005 when a consultant friend of mine, Gary Lamb, came to my home in Benicia, California and connected into a VMware environment he had set up for a customer. He vMotioned a VM from one server host to another – and I was entranced. I immediately envisioned the financial benefits for customers, and we decided on the spot to launch a channel partner business focused on enterprise virtualization with VMware.

Virtualization squeezed costs out of IT infrastructure by slashing the number of servers along with their associated rack space, power, and cooling. The ROI was terrific, even after purchasing an expensive SAN and switch fabric. And virtualized organizations enjoyed additional benefits such as decreased maintenance windows, reduced server management requirements, and vastly improved resiliency.

It didn't take an MBA to realize that virtualization was extraordinarily advantageous. Anyone with a lick of IT experience and common sense could see that taking a whole bunch of physical servers and consolidating them as virtual machines onto a fraction of "hosts" was

going to save a lot of money. The benefits from virtualization were so obvious that it would seem a no-brainer.

But it wasn't. Five years after the introduction of vMotion (seven years after the introduction of ESX), [Gartner estimated](#)<sup>2</sup> that only 12 percent of all x86 workloads were running in virtual machines. While you might think that technologists would eagerly embrace new technology, when they work for IT, they often resist perceived risk. The IT staff is responsible for IT governance, compliance, and interdependencies; they are necessarily concerned about the impact of disruptive technology.

### **My Oversight at Chiron**

The first large virtualization-based ROI analysis opportunity for our newly founded VMware channel partner firm came in 2005 for a multinational biotechnology firm called Chiron that was later acquired by a global healthcare company. At the time, we had a grand total of four employees including the two principals. Chiron paid us \$56,000 to prepare a virtualization assessment and corresponding ROI analysis for IT leadership. They hedged their bet by simultaneously hiring their global outsourcer to do the same.

While our firm might have been both brand new and tiny, we had significant virtualization and financial analysis experience. On the assessment side, we utilized a tool called AOG (later acquired by VMware) to analyze Chiron's server resource utilization. On the ROI front, I met with several of Chiron's staff to gather data such as the cost of servers and frequency of upgrades along with the cost of rack space, power, and cooling. I also learned the cost of the server administration which was performed by the firm's outsourcer. We put together a comprehensive analysis that included the AOG assessment results along with both the projected costs and savings from migrating to a VMware environment. The savings were eye-popping, and the investment payback period projected to take place in well under six months.

I never had the opportunity to see the outsourcer's competing ROI report, but I heard that the CTO was at his desk when both were

presented. He first spent around 20 minutes looking through our report and liked what he saw. He then picked up the outsourcer's document. After briefly skimming through it, he threw it in the trash can, exclaiming that it was garbage.

Given the thoroughness of our analysis and the spectacular projected savings, I figured Chiron would certainly move forward with at least a virtualization POC (Proof of Concept). But days dragged into weeks and then to months, and then the CTO left the firm. We eventually got word back that the company had, at least for now, decided to do nothing.

I somehow managed to reach the CIO and he graciously met with me over lunch where he explained Chiron's decision. He said he was impressed with our analysis and agreed that the numbers were not only likely accurate, but conservative. But in their industry, FDA compliance trumped everything else. They simply could not afford to risk a major virtualization initiative without clear FDA guidelines.

As the Chiron example shows, the numbers – as important as they may be – are only one piece of the bigger picture. I had been so focused on the immense cost savings that I was completely blindsided by the larger FDA compliance requirements. Any IT investment involves either an implicit or explicit consideration of the risks as well as the benefits. A good financial analysis should help spell out the risks and offer potential mitigations. If I had addressed the FDA concern as part of the analysis narrative, I think I could have convinced Chiron to at least put its toe into the virtualization waters with a test/dev environment.

### **CIO Guidance at Concentra Health Care**

Five years later I was working for INX, the publicly traded channel partner that purchased our VMware consultancy. INX's account manager for Concentra Health Care, a national health care company with over 300 Urgent Care centers, arranged for me to fly out in the early spring before the infamous Dallas summer heat set in. I met with Concentra's extremely savvy CIO, Suzanne Kosub.

Concentra was owned by a private equity firm that had very strict financial requirements. Suzanne told me, “Steve, we’ve had a successful, but small, VMware environment for the past several years. I’ve tried asking senior management many times for the monies we need to expand it to an enterprise scale, but we’ve only been able to secure monies in small increments – not enough to even make a dent. I’d like you to provide a comprehensive ROI analysis for virtualizing all 350 of our physical servers.”

Suzanne connected me with her IT finance lead who showed me how to prepare the analysis in a way that would resonate with Concentra’s CFO. This included detailed cost and depreciation schedules shown on a monthly basis over a 5-year analysis period.

Suzanne also coached me about some of the key pain points that Concentra faced. The company’s data center power usage was near capacity, which had resulted in a couple of outages during the previous summer. Concentra was currently renting a backup generator for \$7,600 a month, though there was no guarantee it would suffice as the summer heat again approached. Additionally, the air conditioning was insufficient to deal with all the heat the physical servers were generating. The cost to obtain the five tons of additional cooling necessary to dissipate the heat was \$700,000.

The ROI analysis projected approximately \$2.5M in 5-year savings from virtualizing Concentra’s physical servers, and this number did not reflect any administrative benefits. Compared against a \$1.8M investment, the results were impressive enough to typically warrant project approval. But it was the power and A/C capacity issues that we emphasized in both the analysis report and corresponding presentation that put us over the top. We didn’t need to spend a lot of time quantifying the potential business impact from these issues. The senior executives were aware of just how devastating extended downtime could be to not just business revenues, but also to the firm’s reputation. We emphasized that maintaining a physical environment significantly increased this probability.

I, along with Suzanne, presented the ROI analysis results to the CFO, CEO and a couple of board members. After years of struggling to get funds, Suzanne got tacit buy-off for the two million dollars she needed to virtualize her entire data center. And despite being an “HP shop,” Concentra selected the server we recommended, UCS, as its standard VMware host along with EMC VMAX for storage (of course, this was before Nutanix introduced hyperconvergence to the world). Cisco was so pleased with the outcome that they wrote about the project in an article, [Getting Real With ROI](#),<sup>3</sup> in their 2012 magazine. Suzanne was featured on the magazine cover. Today she is CTO of a Fortune 15 company where she oversees a staff of over 1,500.

## Financial Storytelling

*“My kids have all had a hard time understanding exactly what I do, so I finally told them that I am essentially a storyteller. I talk about a company’s current situation complete with its struggles and opportunities to be better. I then provide an alternative approach for them and show them the goodness that awaits them if they have the courage to make a change.”*

**Jerrod Latham, Business Value Analyst - Nutanix**

The slow adoption of VMware over the years testifies to the inertia inherent in IT. Loyalty to existing vendor relationships, fear of the unknown, previous poor experiences with disruptive technology claims, perceived higher risk, and job security concerns all amplify IT’s inherent conservatism. Even if the ROI analysis is both well-constructed and transparent, and even if IT leadership believes in both the numbers and the credibility of the authors, purely financial reports often lack the “wow” factor necessary for a conviction to act.

In contrast, wrapping a story around the numbers is more likely to be effective as it was with Concentra. The primary intent of an ROI story is to educate with both numbers and with a narrative that grabs the

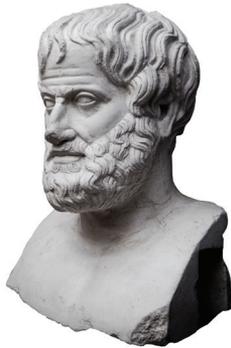
audience's attention. This helps secure buy-off not only from the CFO, but also from the many other organizational stakeholders ranging from technical experts to the security team to other senior managers. They tend to engage more in the process if we can satisfy their human thirst for theme, plot, characters, adversity, and purpose. They are also more likely to remember the results. Their participation significantly increases the probability of project approval.

Financial storytelling elevates the discussion from the short-term tactical such as, "One of our SANs is up for refresh, what should we replace it with?" to the long-term strategic, "What will our business look like in five years and how does IT need to evolve to best support the business?" It enables evaluation of the different infrastructure options within the context of the business objectives the organization is striving to achieve.

Approaching a financial analysis as narrative encourages the IT staff to think beyond just numbers and technology. Since 1995, for example, I've been assisting organizations with evaluating the cost advantages of using software to centralize their physical desktops. They typically start off focusing strictly on cost savings or on architectural issues, such as which of the two most popular virtual desktop solutions they should deploy: Citrix XenDesktop or VMware Horizon View. I instead shift the conversation to "the why of VDI" by asking them to consider why their users even need computers at all? Once they've given that question some thought, I next ask why are they interested in virtual desktops when the physical variety have proven so successful for so many years?

Asking these types of questions prompts IT to take a hard look at the purpose behind bringing in a disruptive technology, as well as identifying the real benefits they're hoping to achieve. One of our health care customers found that moving a physician from a physical desktop to a Citrix virtual machine saved their physicians an average of 47 minutes a day. They said this equated to approximately two increased patient visits. The value of this time-savings in terms of both enhanced

patient care and revenues vastly eclipsed the huge savings enabled through infrastructure refresh and administration reduction.



### **Aristotle and Storytelling**

In 350 BCE, the Greek philosopher, Aristotle, wrote *Rhetoric*, a treatise on the art of persuasion. He discussed incorporating three modes of persuasion to appeal most effectively to an audience: *Ethos*, *logos* and *pathos*. Twenty-five hundred years later, Aristotle's framework is still widely utilized for putting together persuasive talks and papers. *Ethos*, *logos*, and *pathos* all play a part, and all overlap at times, when putting together a financial narrative. As an introduction to Aristotle's framework, a brief summary of each mode follows. Part II of this book takes a deep dive into the three modes of persuasion.

#### ***Ethos***

A financial analysis can have impressive numbers and be emotionally captivating, but if the analyst lacks credibility, it probably will not stand up against the politics and inertia of the status quo. *Ethos* is about building trust. It requires complete transparency in the analysis and calculations, providing backup to all numbers and assumptions, and pointing to other case studies and analyst work.

With Concentra, we established credibility in a few primary ways, starting with emphasizing some of our previous healthcare analyses along with the results they helped catalyze. Following the finance lead's guidance both in structuring the analysis results as well as in providing historical support for the numbers enabled us to compose a document that resonated with the CFO. The CFO in turn assured the other senior executives of its validity. And by proposing UCS, even though Concentra was an "HP shop," we demonstrated both knowledge and confidence in architecting the best solution for the firm. Our analysis described the pros and cons of both the standard HP and disruptive UCS approaches and explained why we felt UCS was the best fit.

### ***Logos***

Logos is an appeal to logic using facts and figures. A good ROI story incorporates the organization's actual costs over several years, builds upon the numerical results, and reflects anticipated growth. It should include all costs affecting any of the competing solutions, such as rack space, power, cooling, administration, maintenance, security, compliance, disaster recovery, and backup and management tools. Historical evidence, or where necessary, explicitly spelled-out assumptions should back the results. The formulas should be both transparent and easily followed. A spreadsheet enables simple if/then calculations to hone the output to ensure it is as accurate as possible.

### ***Pathos***

Pathos, or emotion, is at the heart of telling a captivating financial narrative. It requires knowing the audience, the big picture context, and the "hot buttons" of the decision-makers. By emphasizing the potential loss of business from continuing a status quo scenario, we captured the full attention of Concentra senior management who were then willing to seriously consider the numbers.

In Chapter 2 we make the case that legacy hardware-defined infrastructure is broken, setting the stage for disruptive software-defined alternatives.

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## TIP 02

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*Don't write off a promising new technology because of entrenched large competition.*

# 02

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## The Broken Hardware- Defined Legacy Datacenter

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*“Legacy infrastructure - which includes hardware, software, and even culture - is a crucial obstacle facing many CIOs. Overcoming technical debt and re-skilling the IT workforce are essential components of modern IT innovation.”*

**Michael Krigsman**  
Industry Analyst and Host of CXOTalk  
11/06/2018

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hen you think about it, shadow IT is a bizarre concept. You never hear, for example, about shadow Human Resources or Shadow Sales. Shadow Accounting is occasionally a thing – but then it’s typically called “fraud.” Yet “shadow IT” is nearly ubiquitous among larger organizations with legacy hardware-dependent IT infrastructures.

A business value analyst on my team, we’ll call him “Pete,” previously was a director for a 600-person IT organization. Pete received a phone call one day from his data storage vendor with a surprising question, “Where would you like to have the new storage array delivered?” Perplexed, Pete asked, “What storage array? We are fine with storage.” After ending the odd phone call, he undertook an investigation within the company to see if he could determine exactly what was going on. To his astonishment, he found that the Marketing department had surreptitiously created its own IT organization, which had grown to employ nearly 150 people.

Shadow IT by itself is not necessarily a bad thing. Sometimes departments can come up with surprisingly innovate technology approaches to the unique challenges they face. However, in addition to bypassing the potential scope and scale efficiencies of running all IT functions through Central IT oversight, these solutions often lack the testing, patching, and standards that promote effective governance. Even worse, they can create security risks and vulnerabilities.

The preponderance of shadow IT testifies to the reality of the broken legacy datacenter. IT staff spends most of their time on basic infrastructure tasks and otherwise “keeping the lights on,” restricting their ability to rapidly respond to business requests. In frustration, business units fulfill their pressing IT needs on their own rather than wait for the “Department of No” to act on their behalf.

## Legacy Infrastructure Complexity

*“CIOs report that the majority of their technology budgets are allocated to support business operations (57%), compared to only 26% to fund incremental business change and 16% to bolster innovation.”*

**Deloitte Insights<sup>1</sup> 11/28/2017**

VMware’s virtualization revolution promised a new era of efficiency, but the widespread adoption of proprietary storage arrays arguably increased datacenter complexity. In larger organizations, functional staff dedicated to server, storage, virtualization, and network domains collaborate (often only if necessary) to cobble together individual efforts and initiatives. Processes take more time, human error is more prevalent, and troubleshooting can be a nightmare.

This traditional architecture of centralized storage, storage network and servers is known as “3-tier.” Not only is it complex, it’s expensive, scales poorly, and is not natively resilient. In August 2017, Mostafa Khali came out with his new book, *Storage Design and Implementation in vSphere 6*. He boasted on Twitter that the publisher “managed to fit” his book into only 1,242 pages. I frequently lug this monstrosity (in terms of weight – the book itself is quite good) along as a visual object lesson at speaking engagements. I show the book to the audience and mention that in contrast, (software-defined) Nutanix’s equivalent to this weighty tome is a 12-page tech note. Then I’ll simply drop the book on the stage, where it lands with a resounding thump. It’s a wonderfully visceral way to drive home the weight of complexity from legacy 3-tier environments.

 **@MostafaVMW** 1 Aug 2017

The book is here. The publisher managed to fit the 1242 pages in one volume.

The nature and extent of traditional datacenter inefficiency is stunning. Dedicated specialists turn on LUNs, zone storage switches, manage RAID groups, and rebalance hot spots – tasks that all disappear in a truly software-defined architecture.

## Technical Debt

“Technical debt” originally referred to problems arising from coding shortcuts, but the term has evolved to include infrastructure inefficiencies. Technical debt inhibits business objectives such as digital transformation. It shows up in many ways. An industry analyst once told me about a company diligently maintaining an old Compaq Reliant System that everyone is afraid to turn off because it runs the organization’s core application. Another firm houses a full datacenter in a city with no other organizational connection beyond an old mainframe. A sales rep told me his former employer continued to pay \$17 per Ethernet port per month on floors they hadn’t occupied in two years.

Or consider disaster recovery (DR). An efficient, yet cost-effective, DR environment is so difficult to establish in a legacy infrastructure environment that many DR plans are really in place just to get the checkmark – not because anyone is confident that they’d actually work. A friend’s former employer was paying high monthly costs for DR when, upon a change in leadership, the IT staff discovered that the DR plan consisted of a “mobile datacenter van” that would drive up to their building and plug into their network. Surprise! Their facilities didn’t support the connectivity the mobile datacenter required to operate. And their DR target datacenter pricing included hundreds of licenses of a backup software package that the responsible IT folks never used or even knew about.

## Sunk Cost

A key constraint to adopting new technologies such as HCI is the high Net Book Value (depreciation that has not yet been expensed) of legacy IT assets due to long (often unrealistically long) depreciation cycles. These costs, from an investment perspective, are sunk costs.

The cash to buy these assets has already left the organization. However, replacing the legacy assets with software-defined infrastructure such as HCI or public cloud requires any remaining Net Book Value to either be charged immediately to the Profit and Loss account as an unbudgeted expense, or a period of running costs of both the legacy and replacement infrastructure. Executives with compensation schemes linked to Profit and Loss performance may be reluctant to consider a cash-positive business case for moving to a lower cost software-defined platform because of the high in-year impact of the legacy IT assets write-down.

What is the right approach? Investment analysts increasingly focus on free cash flow as the primary measure of business performance rather than Profit and Loss. This approach validates disregarding the legacy (sunk) IT costs and instead evaluates investment decisions on their impact to free cash flow.

## **Budgeting**

Traditional IT budgeting tends to perpetuate legacy infrastructure inefficiencies by allocating monies to specific “buckets” such as compute and storage. Unless the timing is right for replacing both legacy infrastructure components at once, a software-defined infrastructure alternative such as HCI is at a big disadvantage. The disparate replacement schedule means that an upfront financial comparison pits the entire HCI cost against only either servers or storage. A long-term TCO analysis typically smooths out the timing discrepancies from a financial standpoint.

## **Use It or Lose It**

Another budgeting challenge is the “use it or lose it” policy. As the expiration date of budgeted funds approaches, IT is incented to make large purchases in order not to have its budget reduced the following year. This often leads to less than optimal purchases. While quite appealing to legacy storage reps trying to meet their numbers, it negates the fractional consumption benefit and other advantages of HCI.

Kong Yang, a Nutanix Senior Solutions Marketing Manager, tells a story of an IT director at a Global 2000 financial services company responsible for a multimillion-dollar quarterly budget. In one quarter, the IT department faced a dilemma of underspending its budget by almost \$3 million, which meant that the next budget cycle could cost IT the same amount from its budget. Instead of saving that money, IT purchased \$2.8 million in hardware and software infrastructure before the end of quarter that year. IT basically zeroed out its budget – coming in exactly where it had budgeted the previous cycle without going under or over. The \$2.8M in new equipment sat in the delivery dock for a year before it could be integrated into the datacenter and deliver anything meaningful towards the firm’s mission. At that point, the hardware and software were over a year old – a long time in terms of Moore’s Law and changing technology. IT had to both patch and update the equipment before they could deploy it, and it now only had four, rather than five years left to go on its support and refresh cycle.

### **Private Cloud Struggles**

Decades ago, departments, seeking customized business IT solutions, began circumventing MIS (Management Information Systems) by purchasing their own PCs and applications. To this day, while central IT might have budget for the network, security and other “keeping the lights on” components, individual departments often provide the funding for their own applications and associated infrastructure.

The problem with this approach is that departments purchase the equipment, tools, and operating systems they deem best to fulfill their specific needs with little regard as to how they interoperate with the broader datacenter environment. The result is a datacenter full of silos containing overlapping or redundant equipment that is both expensive and difficult to manage efficiently. It also makes it difficult to effectively implement private cloud.

In a virtualized datacenter, virtual machines migrate across hosts; storage moves between shared arrays; virtual switches direct and

monitor traffic; and virtual load-balancers and firewall appliances replace their physical counterparts. IT fulfills new project requests by simply increasing resource pool capacity. But as 3-tier resources reach capacity, IT has no option but to ask the next service requestor to bear the burden of required expansion. This tends not to work out well for the business unit with a VM request just barely exceeding existing capacity. IT may ask it to fund a whole new blade chassis, SAN or expensive network switch.

Departmental budgeting makes it difficult to fund private cloud which, when done right, brings the same type agility that public cloud offers to the datacenter. Rather than gaining instant and automatic access to the required infrastructure, the business unit either must cough up the monies for far more capacity than it requires, or wait until either the next business cycle, or until other departments fund the purchase.

## **Complacency and Inertia**

Even today after so many years of virtualization success, there are still large pockets of physical servers. As an example, one of our new customers told us that they were only 25 percent virtualized. While they appreciated their virtualized environment, managing it on legacy infrastructure was both complex and challenging. They were out of SAN capacity to support virtualization growth, and the IT staff was too overwhelmed managing both their physical and virtual environments to build a business case for virtualizing their remaining 1,500 physical servers. Their datacenter and physical servers were so old that servers had been known to spontaneously burst into flames. When IT said that they were putting out fires, they meant it literally.

IT inertia is primarily a leadership challenge. Nonetheless, technical debt, legacy budgeting practices, and the Vicious Cycle of Complexity help perpetuate an IT environment that is both expensive to maintain and unable to keep up with the demands of the business.

## 3-Tier Components

The legacy giant datacenter manufacturers did not completely neglect the complexities of 3-tier infrastructure. They made efforts to remedy both the compute and storage challenges.

### Servers

Servers provide the “compute” capability of 3-tier infrastructure. Most x86 servers, with the notable exception of Cisco UCS, are commodity machines that all run the same operating system (OS). Improving the OS or the virtualization hypervisor improves the capabilities and performance of the virtual machines running on the servers. IT can easily scale its compute environment by simply purchasing more servers. Newer servers reflect the technological advances achieved through billions of dollars in R&D from companies such as Intel (CPUs) and Samsung (memory).

Operating servers as a component of a legacy 3-tier environment can create a lot of administrative work in keeping them patched and keeping the firmware updated. There is no easy way to script a process that allows replication of a server configuration – say as a Citrix server designed specifically to run a healthcare ERP. Blade servers became popular with virtualization because of their savings in rack space and cabling requirements, but the proprietary backplanes provide another management requirement and another potential source of failure.

### Cisco UCS

I was a huge proponent of Cisco’s server, UCS, when it debuted in 2009. To this day, my 2009 [blog<sup>2</sup>](#) comparing UCS with HP’s highly touted HP Matrix still holds the record as my most popular post. The UCS has a wonderful story behind it. While virtualization was still young – and primarily viewed as a niche for test/dev applications, Cisco foresaw that it would become the datacenter standard. Cisco approached both IBM and HP (now HPE) about building a new kind of server to specifically address some of the compute challenges of virtualization. Both IBM

and HP turned Cisco down, so it hired VMware co-founder, Ed Bugnion, to head a team at a Cisco-funded company, Nuova, to build what would become the UCS.

The UCS met basic, but vital, virtualization requirements such as accommodating more memory. It also introduced innovative capabilities such as services profiles that allowed IT to provision server templates across its UCS platform. Despite all the naysayers at the time claiming that the low server margin business and Cisco's complete lack of any server experience doomed it to failure, the UCS quickly grew into one of the leading blade servers in the world.

UCS, while not disruptive according to Christenson's definition, was innovative in its day, and I employed financial analysis to help many customers evaluate its unique capabilities. But UCS was designed for a hardware-based world, and that day has passed as customers have made it clear they want a software-defined datacenter. The UCS capability, for example, of running fiber channel over Ethernet is superfluous as HCI eliminates the need for disparate storage arrays entirely. And UCS is complex, the firmware upgrade manual alone is 15 pages. The biggest Achilles heel of UCS, however, is that it only addresses a small subset of the virtualized datacenter issues. Most of the traditional virtualized datacenter challenges involve storage.

### **Storage Area Networks (SANs)**

When comparing HCI vs legacy 3-tier infrastructure, one of the questions our team asks is, "Have you ever had a SAN failure or performance issue?" The answer is almost always in the affirmative. Perhaps one of the most gut-wrenching issues I heard was from a company that had one of its two SAN storage controllers fail, meaning they were running on just one controller. The SAN manufacturer technician showed up promptly, but inadvertently replaced the wrong controller. This resulted in over an hour of downtime costing the company 1.2 million dollars.

SANs are the bane of legacy IT. SAN manufacturers, including all-flash array (AFA) producers, compete with the industry at large by writing their own versions of chip sets and firmware. They fail to capitalize on the technological advances that servers quickly incorporate.

While servers optimize virtualization economics by scaling out compute capability as needed, SANs remain mired in the physical world for which they were designed with two, or sometimes more, physical storage controllers that are proprietary servers. SANs scale up by adding more shelves and disks to the array – until the point is reached where either the SAN runs out of storage bay capacity or the storage controllers become saturated and can no longer handle the performance required. At that point, IT either needs to undergo a very expensive “forklift” upgrade to a new larger SAN, or purchase an additional smaller SAN and suffer through the headache of trying to manage multiple arrays.

Centralized storage was never a good fit for a virtualized datacenter. It moves the flash and disk away from the compute (where they can be most effective) and sticks them in proprietary arrays at the end of the storage network where they’re subject to performance degradation due to network hops and latency. Even all-flash arrays still must communicate with the servers across a separate storage network.

### **Converged Infrastructure**

One of the most basic challenges of legacy 3-tier infrastructure is simply ordering and standing up the individual components. It can easily take weeks or months for organizations to procure the storage, server, and network components and get them working well together. The same is true for the upgrade process. Upgrading firmware in one component can negatively affect another.

In an attempt to mitigate these storage array issues, all the leading storage manufacturers came out with “converged infrastructure” products. Indeed, five of them: EMC, NetApp, Nimble, Hitachi, and Pure Storage, incorporated the Cisco UCS into their converged infrastructure solutions.

**Converged infrastructure offered three key points of value:**

1. Simplified deployment and better control of the upgrade process.
2. Life-cycle management software to validate components and centralize software updates.
3. Common support entry points to eliminate finger-pointing in the field.

It was unfortunate that HP coined the term “converged infrastructure” to describe this packaging. The term is, perhaps, the biggest misnomer in all of IT as there is not a molecule of converged infrastructure in “converged infrastructure.” The only convergence comes from the ability (sometimes) to cut a single purchase order. But the genre does have the advantage of at least enabling simultaneous ordering and delivery of the various 3-tier components which, in many cases, come racked and stacked and tested together. This benefit was enough to make converged infrastructure the darling of the datacenter for years. Converged infrastructure sales exploded – far outpacing the sales growth of stand-alone storage devices.

VCE (later EMC) Vblock was the clear leader in converged infrastructure for several years. In 2011, Channel Insider published an article about a Vblock project I helped facilitate with financial analysis, [School District Solves Outdated PCs, Budget Cut Problems with Desktop Virtualization](#):<sup>3</sup> “Kaplan noted that Presidio projected the \$1.9 million project to quickly provide operating savings of \$687,000. He added that Tyler saved almost \$400,000 upfront from operational expenditure savings alone.”

But the article didn’t mention while deploying the 1,800 users over a number of months, inexplicably, the system started grinding to a near halt. For over a week, students and faculty were complaining loudly while EMC (the maker of Vblock storage) and Cisco (the maker of the UCS) were pointing fingers and unable to resolve the issue. After deploying Lakeside Software’s Systrack, the channel partner discovered that the district had loaded up a new application that was extremely

resource intensive. The problem was solved with an unbudgeted purchase of several hundred thousand dollars to increase Vblock capacity. While neither of the manufacturers was at fault, the incident demonstrates the difficulty that legacy infrastructure can cause with troubleshooting – even when the compute and storage are packaged together under the moniker of “converged infrastructure.”

## Reactive vs. Proactive IT

*“Because it can be easily managed by an individual, [HCI] helps to eliminate the traditional management or departmental silos that exist between virtualization, server, SAN, and storage administrators—greatly reducing the total man hours required to administer, maintain, and monitor the infrastructure.”*

### ESG Economic Value Validation<sup>4</sup>

January 2018

IT organizations commonly pride themselves on being fast when reacting quickly to unplanned requests and outages. Becoming a true partner of the business, however, requires IT to be proactively, rather than reactively, fast. But it is difficult to achieve this type of agility with legacy infrastructure, which is complex in almost every way. Some of the many drawbacks of 3-tier infrastructure include:

- Over-provisioning due large purchase increments that lock customers into old technology.
- Multiple management systems and manual operations that impede flexibility and slow down deployments.
- Scaling limitations that cause customers to outgrow the solution too quickly.
- Limited resiliency from CapEx constraints: Customers must purchase multiple boxes to achieve resiliency.
- Multi-hop support and lack of end-to-end visibility that leads to operational firefighting.
- Complex, big datacenter footprint.

Silos of legacy infrastructure typically go hand-in-hand with silos of IT administration, especially at larger organizations. Virtualization teams get their LUNs from storage teams who in turn procure their VLANs from the network team. It is not uncommon for legacy IT organizations to require weeks or even months to deploy a new VM including all of the change control and approval processes. IT staff often needs to monitor six or more screens to get the metrics they need to determine gaps, weaknesses and risks across all of their infrastructure.

Shifting from a reactive to proactive mode requires agile infrastructure, processes, and teams. The infrastructure must be able to adapt, and IT needs to be able to easily monitor metrics across all infrastructure - proactively forestalling gaps, weaknesses and risks.

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## TIP 03

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*As part of a 3-tier TCO analysis presentation, create a “Pain Slide” that highlights the cost of inefficiencies such as shadow IT, technical debt, and lack of agility.*

In the next chapter we explore why organizations are now turning to software-defined alternatives, and why a “cloud first” strategy is often not optimal.

03

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The  
Software-  
Defined  
Datacenter  
Alternatives

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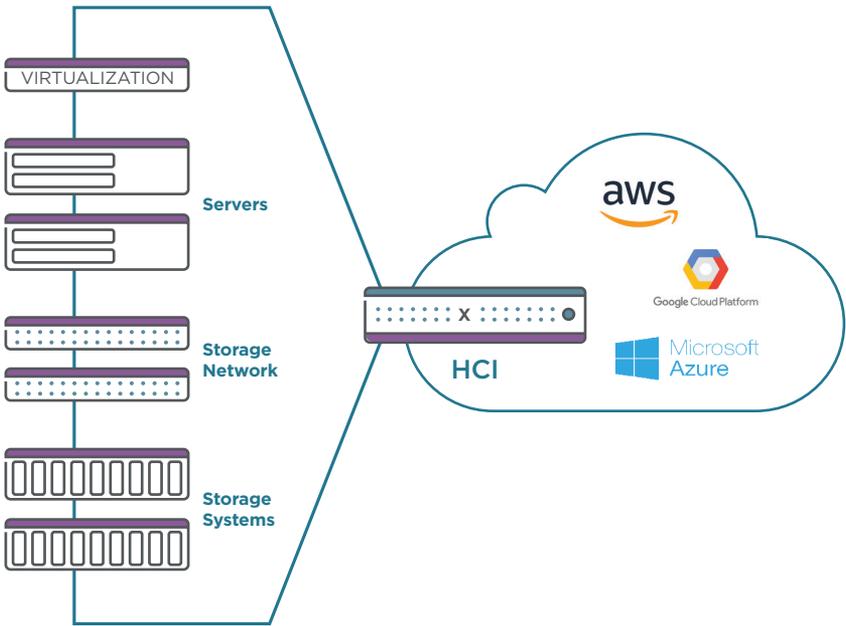
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*“Software is Eating the World”*

Marc Andreessen  
General Partner Andreessen Horowitz

**A**ndreesen Horowitz partner, Marc Andreessen, wrote a famous 2011 Wall Street Journal article titled, [Why Software is Eating the World](#).<sup>1</sup> Andreessen discussed how software companies, especially Silicon Valley firms, are disrupting industries across the planet. Andreessen presciently wrote, “My own theory is that we are in the middle of a dramatic and broad technological and economic shift in which software companies are poised to take over large swathes of the economy.” Perhaps the best example of this phenomenon is the extraordinarily successful iPhone. Apple converged phones, calculators, cameras, Rolodexes, the Sony Walkman, eReaders, maps and other formerly separate technologies into a software-defined platform that changes the keyboard on the fly to match whatever functionality is accessed.

Software is also eating the datacenter. As with the iPhone, datacenter software enables convergence, automation, and efficiency in a way just not possible with hardware. Virtualization is the enabling technology for software-defined infrastructure, whether public cloud or HCI on-premises solutions.



## The Digital Transformation Imperative

*“40 percent of all technology spending will be for digital transformation technologies.”*

**IDC State of the CIO Winter 2018<sup>2</sup>**

Software-defined infrastructure is the “how” of abolishing the Vicious Circle of Complexity. Digital transformation is the “why.”

Digital transformation is well on its way to fundamentally reshaping every industry. No industry is immune, and no business can afford to ignore it. Digital transformation significantly amplifies the urgency of making IT more agile.

Domino's Pizza in 2009 was struggling with a public perception of mediocrity, weak growth, and a stock price in the doldrums. When J. Patrick Doyle took over early the next year as CEO, he transformed Domino's from a pizza company to what he terms a "technology company that also happens to deliver pizza." Half of the 800 headquarter employees now are engaged in software, analytics, and big data. Domino's makes it extremely easy to order a pizza, including via Twitter and Facebook Messaging. By 2016, Domino's stock price had increased 2,000% – more than other notable technology companies including Amazon, Apple, and Google.

Kodak's story, on the other hand, shows what can happen when organizations ignore the digital imperative. Although Kodak invented the digital camera back in 1975, it doubled down on film rather than disrupting its existing business. Kodak went from a market cap of \$30 billion, 145,000 employees, and two-thirds global camera market share to filing for bankruptcy in January 2012.

Businesses are demanding faster digitization, innovation, and delivery of new services. These are not just "nice-to-haves" – they are often essential for survival. Rather than respond reactively to business requests, IT must both understand and partner with the business. Indeed, it must lead the charge to digital transformation.

While a great many variables go into enabling successful digital transformation, hardware-defined legacy IT infrastructure makes the journey much more difficult. Rajnish Arora, IDC VP Enterprise Computing, put it this way in a 2018 presentation, *Modernizing Infrastructure for Success in the Digital Age*, "Infrastructure transformation will be a key underpinning of every customer's digital transformation journey in the next decade."

## HCI and Public Cloud: Two Sides of the Same Software-Defined Coin

*“The rise of cloud computing has driven awareness of new infrastructure models among IT purchasers and consumers. Many of today’s largest public cloud environments leverage a modern infrastructure architecture referred to as hyper-converged. One mechanism organizations use to build out cloud infrastructure is hyperconverged infrastructure (HCI).”*

**IDC - Digital Transformation and Cloud Computing Drive IT Transformation: Are You Ready?<sup>3</sup>**

While possibly apocryphal, the story goes that prior to the launch of Google, co-founder Sergey Brin took a tour of the Yahoo datacenter, which consisted of well over 1,000 NetApp Filers. He was astounded that so many of the arrays sat mostly idle due to lack of activity by users in different global time zones. Brin refused to accept his team’s explanation that storage arrays could not accommodate varying sets of user data. He told them to find a way to make Google’s storage agile, scalable, and efficient.

The search startup hired a team of scientists who developed the Google File System<sup>4</sup> (GFS) and MapReduce to enable a massively scalable environment that utilized only commodity servers with local drives and had no need for managing and optimizing the storage environment. The impact was quickly felt throughout the Internet provider space, whose leaders eventually all adopted a Google-like architecture. Robin Harris of StorageMojo estimated<sup>5</sup> that Google was able to realize a cost advantage five to eight times greater than former search leader Yahoo. For Yahoo, it was “like bringing a knife to a gunfight.”<sup>5</sup>

A couple of the Google developers of the Google File System, including the lead scientist, saw an opportunity to bring the public

cloud advantages of software-defined infrastructure to commercial and government enterprises by leveraging the hypervisor itself. Along with a third engineer, they cofounded Nutanix and in 2012, they introduced the world to what today has become known as hyper-converged infrastructure. HCI, like GFS, enables software-defined storage running on commodity servers. HCI provides the foundation for emulating public cloud attributes such as enabling rapid time to market, fractional consumption, simplicity, and continuous innovation via software upgrades.

Rather than utilizing proprietary storage arrays, the leading cloud providers instead provide storage as an application running on millions of commodity servers. This is the same software-defined model employed by leading HCI players. Both public cloud and HCI scales out incrementally as needed.

Just as software-defined public cloud has won outside of the datacenter (as opposed to classic ASPs, outsourcers or providers using hardware-defined 3-tier infrastructure), HCI is winning the on-premises datacenter wars. Public cloud and HCI together have broken the 10+ year Vicious Circle of Complexity introduced in Chapter 1. In 2018, Gartner came out with its inaugural HCI Magic Quadrant and retired its Magic Quadrant for integrated systems which included converged infrastructure. [IDC said](#)<sup>6</sup> that as of the second quarter of 2018, HCI had for the first time surpassed converged infrastructure sales. Even Nutanix and VMware, which don't necessarily agree on much, both agree on the end of SAN. VMware CEO Pat Gelsinger stated in a presentation at 2017 VMworld, "All infrastructure will become hyperconverged."

 **@BrentPiatti** 9 May 2017

Mic drop. "All infrastructure will become Hyper-Converged" [@PGelsinger](#) at [#DellEMCworld](#)

Software-defined HCI architecture varies wildly among manufactures, as does vision, support, performance, resiliency, and so on. Nutanix, for example, considers software-defined HCI as table stakes for building an enterprise cloud to bring the full goodness of public clouds to enterprise datacenters, including native virtualization. As Prabu Rambadran wrote in his blog post, [Private Clouds, Enterprise Clouds and More](#),<sup>7</sup> “Software-defined HCI is a prerequisite for enterprise cloud because it pools compute, storage, networking and virtualization resources through highly available and distributed software without any dependency upon proprietary hardware.”

## Separating Public Cloud from the Hype

In the staid world of IT, public cloud has gained momentum incredibly quickly. AWS, launched in early 2006, achieved \$17.5B in revenues by 2017. A 2018 [Citi Research report](#)<sup>8</sup> projects \$80B in 2020 public cloud revenues by the three leaders: AWS, Azure and Google Cloud Platform.<sup>7</sup>

All of this momentum creates lots of pressure to lift and shift everything to public cloud as a way to escape the complexity of legacy infrastructure. When I speak with IT leaders across the globe, I often hear something along the lines of, “We have a cloud-first strategy.” As an analyst, I feel it is my job to question strategic decisions, and thus naturally ask, “Why?”

The wide range of responses is quite interesting. In some cases, the answer is something along the lines of, “Everyone knows that cloud is the way to go.” Sometimes it reflects either external or internal pressure: “The CIO told us she wants it,” or “The Board thinks we should be using Cloud.” Occasionally, an IT leader will say something like, “We need more agility – the ability to get to market more quickly.” In most cases, though, the reason given is, “We want to save money.” When I hear that, I reply, “Really? Very interesting. Would you mind sharing your analysis with me?” No one has yet done so. We find that for the majority of workloads, a financial analysis shows that while public cloud offers myriad advantages, saving money isn’t among them.

Public cloud is a powerful and disruptive software-defined infrastructure alternative. But rushing to public cloud without first doing extensive technical, operational, organizational, and financial due diligence is as foolhardy as maintaining legacy infrastructure – or, for that matter, blindly going “all in” with HCI.

### **Case Study: A Large International Real Estate Public Cloud Customer**

George, the Chief Cloud Officer of a large international real estate company with a “cloud-first” policy said to Tim McCallum, Director of Nutanix Customer Success Finance, “Tim, Nutanix is interesting, and I get the whole thing about bringing cloud-like agility and simplicity to my datacenters, but we’re going to stay with public cloud because it’s really cheap.”

Tim responded, “Well, we do a lot of financial analyses and we find that for predictable workloads, public cloud in general is about two to three times the cost of Nutanix Enterprise Cloud. I can help show you this using your own data if you’re up for it.” George replied, “Tim, I’ll tell you what, I’ll send you an RVTools output that our public cloud provider used to size our next workload environment. You can price it as well, but don’t get your hopes up.”

Several days later, Tim brought a financial analysis to George, summarized by the chart shown in *Figure 3-1*. “George,” he said, “We’ve mapped all the public costs and, in fact, about 58 of the workload instances were marked as not requiring more than 36% monthly activity. The results are a 73% cost reduction with Nutanix – less than one-third the cost of public cloud. Six weeks later, the real estate company was a Nutanix customer.

This situation is hardly uncommon. IT leaders, even those who have formal finance backgrounds, often get caught up in the hype of public cloud and make incorrect assumptions about costs due to an enticingly small up-front investment. This can easily lead to decisions that are less than optimal.

## 5 Year TCO Financial Summary

	Option 1: Public Cloud	Option 2: Nutanix
<b>Capital Costs</b>		
Compute Layer	\$0	\$271,173
SAN Ports & Cables	\$0	\$480
Capitalized Professional Services/Installation	\$0	\$4,800
<b>Sub-Total Capital Costs</b>	<b>\$0</b>	<b>\$276,453</b>
<b>Operating Costs</b>		
Cloud Instances	\$1,074,885	\$0
EBS Storage	\$163,665	\$0
AWS Support	\$105,634	\$0
Data Center Rack Space	\$0	\$6,857
Power & Cooling	\$0	\$8,191
Post Warranty Support	\$0	\$39,016
Administration LOE	\$13,359	\$31,250
<b>Sub-Total Operating Costs</b>	<b>\$1,357,543</b>	<b>\$85,314</b>
<b>Total Cost of Ownership</b>	<b>\$1,357,543</b>	<b>\$361,767</b>

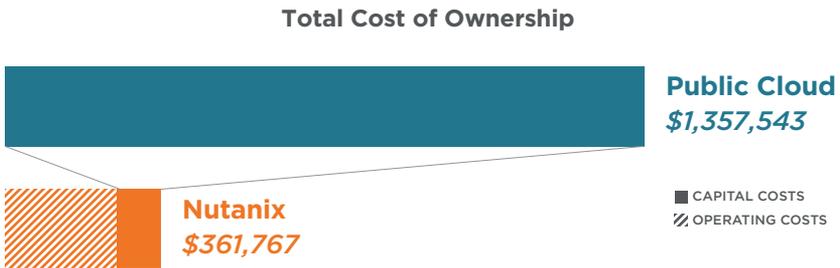


Figure 3-1: TCO Comparing Public Cloud vs. Nutanix

Organizations often march headlong into the public cloud without fully understanding the financial implications. An IDC study, [Private vs. Public Cloud](#),<sup>9</sup> for example, says that predictable workloads (which typically account for the majority of applications) on average result in costs more than twice those when running on-premises with Nutanix HCI. A July 2018 IDC survey of 400 organizations, [Cloud Repatriation Accelerates in a Multi-Cloud World](#),<sup>10</sup> found that 80% of organizations in the study had repatriated at least some applications out of the public cloud back on-premises, and that 50% of all public cloud applications installed today will move back on-premises over the next two years.

## Rent vs. Buy

If you are going to use a car a few weeks out of the year, purchasing a vehicle would be much more expensive than renting. If, however, you are going to use the car a majority of the time, it is far less expensive to purchase it rather than rent it year-round.

The same logic applies to a public cloud. Elastic, burstable workloads make all kinds of economic sense to run in the public cloud. But you can typically run predictable and persistent workloads at a much lower cost on-premises – especially when running on a software-defined hyperconverged platform.

## Staffing Requirements

In addition to surprise at the high monthly cost for “renting” public cloud VMs to run predictable workloads, many organizations are unprepared for the huge investment required in staffing expertise. Chief Cloud Strategy Officer at Deloitte Consulting, David Linthicum, wrote in a May 2018 [InfoWorld](#) article,<sup>11</sup>

*“The fact is that enterprises have done a poor job in prepping the talent pool for the cloud. The skills gaps—not only in cloud security but cloud databases, cloud networking, and cloud monitoring—is becoming the real barrier to enterprise cloud adoption.”*

Migrating to public cloud requires expertise for security, redundancy, backup, specific tool sets, and so on. Organizations must either hire specialized staff or contract with consultants. And they must pay for overlapping expertise for both the on-premises and public cloud architectures during the lengthy [migration process](#)<sup>12</sup> – assuming they ever accomplish full migration.

### Unpredictable Costs

As Cloud Economist, Corey Quinn, pointed out in a 2/25/2019 tweet, public cloud invoicing is similar to [U.S.] medical billing in that customers don't know the cost until afterwards when they're already on the hook for it. This sentiment is echoed in an article in *The Information*, [As AWS Use Soars, Companies Surprised by Cloud Bills](#),<sup>13</sup> as well as a ZDNet article, [Cloud Computing Sticker Shock is Now a Monthly Occurrence](#).<sup>14</sup>

 @QuinnyPig 25 Feb 2019

Medical billing is the only time where you don't know what it's going to cost you until afterwards, when it's too late and you're already on the hook for it.

Oh and the cloud's billing model does that exact thing too.

Nutanix published an [Enterprise Cloud Index](#)<sup>15</sup> in late 2018 which consists of VasonBourne-conducted research of 2,300 global IT decision-makers. Only 6% of the respondents using public cloud services said they stayed under budget, while 35% overspent. Public company shareholders, relying on CFO quarterly or annual reporting, tend to dislike these potentially large unexpected costs.

### Complex Invoices

The accounting environment for public cloud is complex. Monthly bills often run to many pages and are difficult to understand and reconcile. AWS, for example, published a June 2018 22-page [whitepaper](#)<sup>16</sup> to

explain its pricing model. Organizations may require an on-going financial resource just to determine the correct accounting treatment of invoicing.

### Interoperability Limitations

Public cloud can also entail huge costs arising from switching workloads from one cloud provider to another. These costs include the extensive requirements of learning a new provider's tools and of writing to that provider's APIs.

### Performance Concerns

Resolving public cloud performance issues can incur significant unexpected cost from VM and storage usage as well as from data egress charges and other services. A July 2017 [Forester survey](#)<sup>17</sup> of 500 cloud adapters states, "89% of early migrators have experienced performance challenges while migrating mission-critical applications." Common performance challenges include latency between on-prem and off-premises applications, dependencies on other apps not in the cloud, the "[noisy neighbor](#)"<sup>18</sup> effect in the cloud, and so on.

### Security Considerations

While public cloud providers have an ability to correct security flaws more quickly than most enterprise IT shops, the propensity to share hardware between many customers can sometimes also make them [more vulnerable](#).<sup>19</sup> Deloitte's David Linthicum [wrote](#),<sup>20</sup>

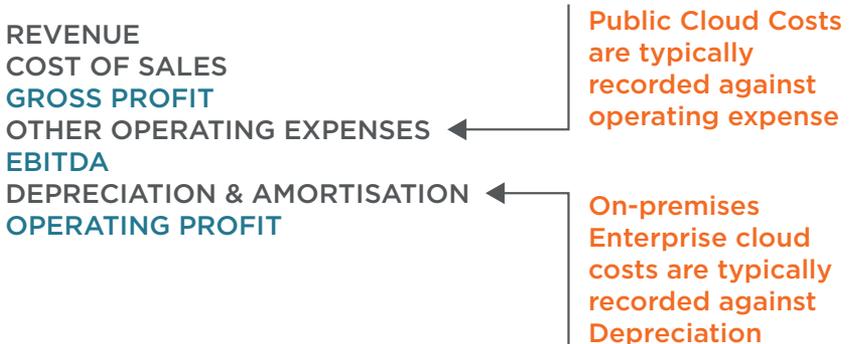
*"The [McAfee] report reveals that one in four organizations using infrastructure as a service (IaaS) or software as a service (SaaS) have experienced cybersecurity threats that compromised some data. Moreover, one in five were infiltrated by advanced attackers targeting their public cloud infrastructures."*

Resolving security flaws can add unexpected expense. Additionally, public cloud security is often inflexible. One public cloud customer told me that they spent \$10 million per month with the service, yet could

not persuade the provider to make the security adjustments it needed to run its virtual desktops in the cloud.

### Public Cloud and the Impact on EBITDA

Investors often favor Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA) as a key performance indicator because it tends to closely reflect the underlying operating cash flow of a business. But EBITDA results may determine the compensation plans of senior company executives, and public cloud charges negatively impact EBITDA, as seen in *Figure 3-2*. On the other hand, income statements show on-premises capital expenses as a charge against depreciation over time which does not impact EBITDA.



**Figure 3-2: The Impact of Public Cloud Costs**

## Hybrid and Multi-Cloud

*“To support the new types of workloads of the digital era, such as hybrid cloud and edge computing, I&O leaders must align their IT platform strategy with the new technology and architecture of HCI, IS and composable infrastructure.”*

Gartner [How to Migrate From Legacy Infrastructure to HCI and Integrated Systems 3-20-2019](#).<sup>21</sup>

While both public and HCI-based enterprise clouds provide the agility necessary to achieve digital transformation, the cost and complexity of the public cloud can make “cloud first” a very expensive strategy. A multi-cloud strategy, on the other hand, typically embraces both private and multiple public clouds. This hybrid approach can provide the best of both worlds: Public cloud for cloud-native, bustable, and non-predictable workloads, and on-premises HCI (i.e. enterprise cloud) for everything else. In addition to lower and more predictable costs, enterprise cloud enables greater control, enhanced regulatory compliance capabilities, customized security, and more flexibility in financial structuring.

IDC’s July 2018 study referenced earlier in this chapter concludes that a multi-cloud environment is now, “...the norm for enterprise organizations.” This conclusion is further supported by a mid-2018 Enterprise Strategy Group (ESG) survey of 350 IT decision-makers, [Tipping Point: Striking the Hybrid Cloud Balance](#).<sup>22</sup> The study showed that around half of respondents (49%) plan to run the majority of their applications/workloads in their own datacenters; while another 43% plan to evenly split applications between their own datacenters and public cloud. The on-premises solutions now offered by the three leading public cloud providers further validate the studies’ conclusions that multi-cloud is the future.

### **Cloud is Not a Destination**

“Cloud is just someone else’s datacenter.” While a common IT expression, it is inaccurate. Cloud is not a destination at all; it’s a software-defined approach enabling automation of IT infrastructure management. Any IT infrastructure decision, whether legacy, public cloud, or enterprise cloud, should be carefully evaluated within the context of the organization’s long-term business objectives and application mix. This is the only way to ensure an organization selects the optimal architecture to enable success.

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## TIP 04

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*Don't just assume public cloud is cheaper than on-premises infrastructure – especially HCI. Do the math.*

In the next chapter, we discuss the importance for IT to be fluent in the language of business, finance, and how financial analysis can help IT leaders mitigate both status quo and public cloud bias.

# 04

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## Using the Language of Business to Rationalize IT Decision- Making

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*“What I often find with technologists is that they lack even the basics of how finance is used in a business. If the language of business is finance and you can’t speak even the basics of that language, it means you are missing out on the fundamentals of the enterprise of which you are a part. Basics like the difference between operating expense and capital expense remain a mystery for many engineers.*

*“...So, take the time to invest in yourself and learn the basics. Be able to read and understand a simple Income Statement and Balance Sheet. Know how capital spending becomes an asset and then depreciates, becoming an operating expense. Understand the difference between income and cash flow. The aim is not to become a CPA, but to be able to be conversant in the lingua franca of business...finance.”*

**Bradly Strock**  
**CIO PayPal. Transformation Nation.<sup>1</sup>**  
**CIO 2/27/2018**

In the last chapter, we discussed the economic disadvantage of a “cloud first” policy not predicated upon analytical due diligence. External pressure to lift and shift to public cloud is one of the two largest inhibitors to rationalizing IT infrastructure decision-making. The other is an undue internal pressure to maintain the status quo.

## Status Quo Pressure

IT is responsible for governance, interoperability, security, and SLAs. A skepticism regarding technology claiming to be disruptive is healthy. Sometimes, however, IT resistance to new technology is due to factors that do not work in the organization’s best interest. This is known as the agency dilemma.

### Agency Dilemma

*“It is difficult to get a man to understand something, when his salary depends on his not understanding it.”*

**Upton Sinclair**

In early 2013, a purchase order Nutanix expected to receive from a large, well-known organization failed to materialize. Nutanix’s channel partner investigated and found that one of the storage administrators had gone around the VP of IT and met directly with the CFO, “When I joined the organization, you made me certain assurances. If Nutanix gets in the door, my career here will be short-lived. I’m over 50 and I’ll sue you.” I don’t know exactly what happened, but around 30 days later he was no longer with the organization and the PO came in.

The IT staff may be comfortable with the status quo and not be keen to introduce a disruptive new technology. They may have a good relationship with their existing vendors or channel partners that they don’t want to disrupt. Or they may even have built their careers around

certain certifications that will be rendered irrelevant by the disruptive technology. This fear of irrelevance makes them more amenable to continuing to purchase complex 3-tier technology, even at a greater cost to the organization.

## Confirmation Bias

The agency dilemma only affects a minority of IT staff. In my experience, most want what is best for the organization even if it stretches personal comfort zones. But when it comes to disruptive infrastructure, they still may face what is known as confirmation bias - unintentionally excluding information inconsistent with existing beliefs. This tendency is exacerbated with HCI because it requires a whole new way of thinking about infrastructure.

## Evaluating HCI Through a 3-Tier Lens

Imagine we were able to travel back in time 30 years and approach a would-be taxi passenger standing in the rain fruitlessly trying to hail a cab. We could tell her that in the future a company called Uber would use new technologies such as the Internet and smartphones and GPS to transform her transportation experience. Future rides would be simple,



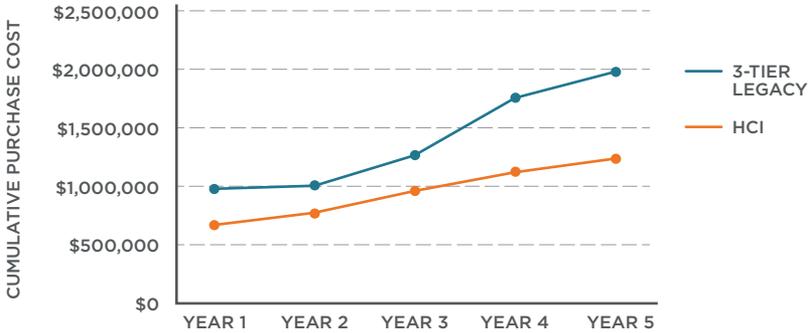
predictable, and pleasant. However, lacking the context to understand these new technologies she would likely be skeptical that Uber could accomplish this.

This is similar to the challenge faced when seeking to evaluate disruptive infrastructure such as HCI. The IT staff is naturally inclined to assess HCI the same way that they've long used for analyzing their legacy infrastructure purchases. While IT organizations frequently think about storage in terms of cost per GB or TB, for example, the reality is that they must buy a SAN as a complete, and very expensive unit. And not only do they pay for the initial capacity upfront, but also extra capacity to address the increased resource demands projected for years down the road. The IT organizations therefore must bear the high capital expense cost of the SAN and extra capacity in addition to all of the associated rack space, power and cooling. And, over time, the SAN technology becomes increasingly slower and less capable when compared with modern emerging technologies.

In contrast to 3-tier infrastructure, HCI enables expansion of the cluster one node at a time enabling customers to benefit from Moore's Law. Moore's Law, which states that the number of transistors on a processor doubles every 18 months, has long powered the IT industry. There is no end in sight for the continued performance benefits of hardware, even though the way in which that performance is achieved, such as using more cores, photonics and memristors, differs from the original precepts. HCI incorporates hardware enhancements such as NVMe, Octane, 3DXpoint, and other new technologies as part of the cluster - increasing the average number of VMs per node.

*Figure 4-1* shows an example, based upon an HCI customer, comparing purchase costs between a SAN and HCI - assuming a SAN refresh takes place every four years. When modeled out over a five-year period, the fractional consumption capability of HCI ends up slashing the number of nodes required. And the customer need not purchase any excess capacity, thereby reducing rack space, power, and cooling, and eliminating all of the risk of a forklift upgrade.

## Legacy vs. HCI Purchases



**Figure 4-1: Staircase Purchase of a SAN vs. Fractional Consumption of HCI**

Increasing VM densities can significantly impact the results of an HCI financial analysis, yet I have never seen a model outside of Nutanix reflect the advantage gained from improving technology over the analysis period. This glaring oversight shows the challenge of quantifying a disruptive solution without a deep understanding of both its technical and financial impacts. IT staff (and potentially channel partners, consultants, research organization, etc.), can demonstrate bias against the new solution simply due to a lack of experience with it.

### Politics

One of our field managers tells a story of when he used to work for Palo Alto Networks – a disruptor in the cyber security field. A large, well-known organization was evaluating four security products. The technical team ranked Palo Alto Networks number one, and a security product manufactured by a large vendor last. In their evaluation, they further stated that if Palo Alto Networks wasn't chosen, then they could still get by with the second and third-placing solutions, but that under no circumstances should product number four be chosen. The CIO,

however, went with product number four. It turns out that people at the manufacturer that produced product four had helped the CIO get his job at the company. The technical team was demoralized as a result and some of the members even left the company.

IT often jokes that politics are layer 8 of the 7-layer networking stack. Politics can include such diverse scenarios as the agency dilemma highlighted in Chapter 2, a CEO who is friendly with a status quo manufacturer executive, or a new CIO who is determined to make a name for herself by lifting and shifting IT to public cloud.

### **Consumerization**

Widespread consumerization leads many people who have never worked in Information Technology to think they know what is better for the organization than the professionals hired for the task. A bullheaded sales manager, a disgruntled faculty member or an ill-informed CFO all might negatively impact rational IT decision-making.

### **TCA (Total Cost of Acquisition) Focus**

IT professionals frequently make purchase decisions based primarily, if not completely, on upfront costs alone. These decisions are sometimes budget-driven, or even directed by the CFO or others. But a TCA analysis provides only a small snapshot of the much bigger TCO picture. It is almost certain to be misleading when evaluating disruptive infrastructure.

The majority of IT spend<sup>2</sup> is operating cost, which consists of expenses such as IT labor, rack space, power and cooling, disaster recovery, backup, maintenance, and support. In many cases, determining these costs requires some investigation and perhaps even speculation. But ignoring them when evaluating disruptive infrastructure leads to a less than optimal purchase strategy – most likely in favor of the status quo.

### **Case Study: National Museum of Australia**

Mike Webb is CIO of Australia Commonwealth Treasury, a Nutanix

Customer Success account. He was previously CIO at the National Museum of Australia (“NMA”). Mike was attempting to pioneer a community cloud initiative by consolidating the IT divisions of up to 20 government agencies and servicing their IT needs from NMA.

As outlined in the TCO analysis we prepared, NMA wanted to modernize its infrastructure and achieve four objectives:

- **Operational Simplicity**
  - Reduce the number of component parts it takes to deploy a complete solution.
  - Dramatically increase automation.
  - Streamline administration to incorporate as few interfaces as possible – preferably one single administrative interface.
  - Minimize or eliminate technology specialization, allowing NMA to maximize IT staff activities and functions.
- **Platform Scalability**
  - Provide the ability to incrementally scale in building block sizes that match NMA’s mission and growth patterns.
  - Provide predictability for each operational work unit, making budgeting and capacity planning achievable.
  - Incrementally scale up or down with little to no administrative burden and with no impact to the mission.
- **Reliability**
  - All solutions must be self-healing.
  - All solution components must be distributed.
  - The core platform must include integrated disaster recovery capabilities.
- **Costs**
  - No overprovisioning capacity to facilitate future requirements.
  - Reduce the overall capital exposure for upfront and incremental purchases.

- Reduce operating expenses wherever possible, specifically around facilities costs (i.e. space, power and cooling).

Here is Mike's story about the obstacles he faced and how he overcame them.

*"The more I investigated Nutanix, the more I thought it was a perfect fit for enabling our IT and associated business goals. But the museum had been a long-time customer of EMC and both the IT staff and senior management valued the relationship. When I suggested HCI to a senior systems administrator, he dug in his heels. He insisted there was no good reason to purchase storage from any vendor other than EMC - they're the leader, always have been, and always will be.*

*We engaged with Nutanix on a TCO analysis comparing their solution vs. refreshing our legacy environment. The analysis showed 5-year projected savings of \$2.73M, a 60% reduction. And I believed the analysis was quite conservative. For instance, it didn't include the risk of outgrowing legacy storage before our next refresh upgrade, nor even the cost of the upgrade 5 years down the road.*

*I presented the results to senior management along with my vision of how we could make NMA a clear leader in the commonwealth government's Communication and Arts portfolio - of which we were a part. This opportunity combined with the substantial savings made for a strong case - and we received funding to go ahead with Nutanix migration as well as endorsement for pioneering the community cloud initiative.*

*It took a while, but the systems admin came around as well and led the Nutanix pilot, including migrating VMware vSphere to AHV. Now it's like he's a religious convert. He's promoting the technology to anyone who will listen to him and telling them that he wished NMA had implemented it years ago."*

## Addressing Public Cloud and Status Quo Pressure

How does a CIO address, on the one hand, a tendency to “hug” legacy infrastructure and, on the other hand, pressure to lift and shift everything to the public cloud? A financial analysis exposes the costs of all alternatives under consideration. It helps both identify and quantify business benefits that might otherwise be ignored. An analysis helps the IT staff and other organizational stakeholders make the optimal decision for the organization while also building the case for budget dollars.

### **Objectives of a Financial Analysis**

Chapter 2 discusses the tendency for a traditional IT department to purchase infrastructure in a disjointed fashion. They buy for a new app, a new project, for more capacity, or to replace an aging component. When combined with a 3-tier confirmation bias, this tendency can lead to a short-sighted buying approach focused on the lowest upfront cost to complete a task, such as finding a replacement for a SAN that is up for refresh. This purchase approach completely misses the opportunity to consider the much bigger picture of how storage even fits into an overall business and IT strategy.

The discipline of engaging in a financial analysis prompts IT to think longer-term and bigger-picture – in other words, more strategically. A good financial analysis considers all the various capital and operating expenses that impact the evaluated solutions. It also incorporates both projected growth rates and anticipated improvements in technology.

Even more importantly, the analysis should encourage a discussion around business objectives – something IT staff may not spend a lot of time thinking about. Traditional IT staff often feel disconnected from the business in terms of strategic direction. They may be unfamiliar with the overall line-of-business (LOB) objectives and the KPIs with which the business is measured. As discussed in Chapter 2, rather than innovating new ways to solve customer problems and drive value for

the enterprise, traditional datacenter IT staff and their leaders often spend most of their time just keeping the lights on.

### **Bringing Clarity**

The complexity of 3-tier infrastructure often results in multiple brands and models of SANs. Different types of both blade and rack mounted servers connect to the different arrays via multiple storage fabrics and switches. In larger enterprises, IT staff may not even know the makeup of their disjointed infrastructure environment, let alone the cost to run and upgrade it during the next refresh cycle. Going through the financial analysis process forces IT to take a hard look at the composition of the existing datacenter environment – both today and what it will look like in the future.

### **Reducing Risk**

Making a big purchase decision entails risk, which is amplified by the uncertainties of disruptive infrastructure. Preparing a thoroughly researched and credible financial analysis helps mitigate concerns. The analysis can often serve as a catalyst to help dispel a proclivity for status quo.

Quantifying the significant savings and other benefits an organization stands to achieve by migrating to software-defined infrastructure helps offset an overly risk-averse approach. It can also help the CIO address some of the challenges around legacy IT environments discussed in Chapter 2, including shadow IT, technical debt, legacy budgeting, outside pressure, and politics.

### **Shadow IT**

The instinctive reaction of IT leaders is often to try and quash shadow IT. This habit wastes resources while leaving an unfulfilled need. Instead, a CIO can put together a powerful financial story for the offending departments that encourages the innovation they require while shifting both budget dollars and responsibility for the actual deployment and oversight to the (now) much more agile and responsive central IT organization.

## **Technical Debt**

Another way to describe technical debt is “complexity.” Complexity inevitably comes with a price tag, and reducing it saves the organization money in addition to making it more agile and responsive. A CIO can attack each area of technical debt with a fresh perspective and rigorous analysis that builds a case for deploying a superior technology.

## **Legacy Budgeting**

The CIO can use her knowledge of finance, IT, and the organizational structure to craft a persuasive rationale for bringing an end to project-based funding. Moving to an operationalized centralized budget provides IT with both the control and funding it needs to move to a highly-efficient multi-cloud infrastructure. At the same time, eliminating the complexity and chaos of the traditional datacenter enables a vastly more responsive, effective, and efficient IT organization.

## **Outside Pressure**

A well-researched financial analysis can serve as the underpinning for a comprehensive organizational cloud strategy. When Board members, or anyone else, tries to pressure IT to shift everything to public cloud, the CIO can refer them to the organization’s cloud strategy document, providing assurance that IT has already deeply considered all aspects of public cloud and is following a rigorously determined strategy that is proving optimal for the organization.

## **Cutting Through Politics**

While even the most expertly prepared financial analysis is no guarantee of cutting through organizational politics, the analysis process increases the likelihood. An analysis should involve not only key IT decision-makers, but financial and business stakeholders as well. Clearly identifying organizational objectives and pain points while quantifying alternative solutions makes it easier for all parties to recognize the value of each solution to the organization.

## Case Study: Translating Technology into Economic Impact

The analysis process does more than identify business objectives, it helps quantify how the infrastructure solution being evaluated can impact those objectives. This was evident with one of the largest not-for-profit healthcare systems in the United States. Senior Director of Infrastructure, Don, called up Tim McCallum, and said, “Tim, I have a problem and I need your help explaining it to the business. We have over 900 access points, meaning clinics and kiosks, within the hospital. But it takes us an unacceptably long time to get the access points deployed because it requires more than three months to bring up the virtualization infrastructure. Our primary problem is that we keep running out of storage and do not have good visibility into who is using the storage.”

Tim was about to interject, but Don continued, “Tim, the problem gets worse. I have a ‘chicken and egg’ thing going on. I am now buying extra storage to try to have it when the hospital needs it. But my administrators have gotten used to having all this extra storage and commonly over allocate it. This overallocation then uses up all the storage meaning it’s not available when the access point is needed. Visibility into the VM environment, API automation and orchestration would fix my issues.”

Because the Nutanix technology solves the storage visibility issues using API automation and orchestration, Tim was able to prepare a financial analysis for Don utilizing numbers secured from the business. The analysis reflected a capability of deploying new access points about 3 months faster, enabling doctors to see more patients. This projected a boost in yearly revenues of about \$2.5 million. When combined with additional benefits from reducing infrastructure and IT staff cost, the analysis was very persuasive. The hospital shortly afterward became a Nutanix customer.

## Enhancing Partnership with the Business

*“Learn your company’s financial levers and metrics so that your entire team understands how your company’s performance is measured by the board, investors, and outside analysts.”*

**Peter Weis, VP & CIO, Matson**

From Transformation Nation.<sup>3</sup> CIO.

CIOs must be fluent in the language of finance to have the same conversations as the other C-suite members. This was true in the era of the traditional CIO, and it is even more true for the transformational CIO.

### The Transformational CIO

*“In order to successfully achieve digital transformation, CIOs need to transform themselves.”*

**Tim Crawford**

CIO consultant, Tim Crawford writes in The Difference Between the Traditional CIO and the Transformational CIO,<sup>4</sup> “Many of the traditional CIO characteristics are centered around building an organization that supports technology...In many ways, unlike the traditional CIO, the transformational CIO is having the same conversations as the rest of the c-suite...Transformational CIOs are very much looking for business opportunities like that of the CEO or many of the other c-level executives. The transformational CIO is perceived by the other c-level executives as an equal.”

While technology is important, and increasingly core, to all organizations, savvy CIOs know that financial fluency is the key to working effectively with the business. They understand other senior managers are not looking for techno-babble or disruptive capabilities when evaluating different infrastructure alternatives. These business leaders want to understand the long-term total financial costs and benefits of each option, as well as their impact on business outcomes.

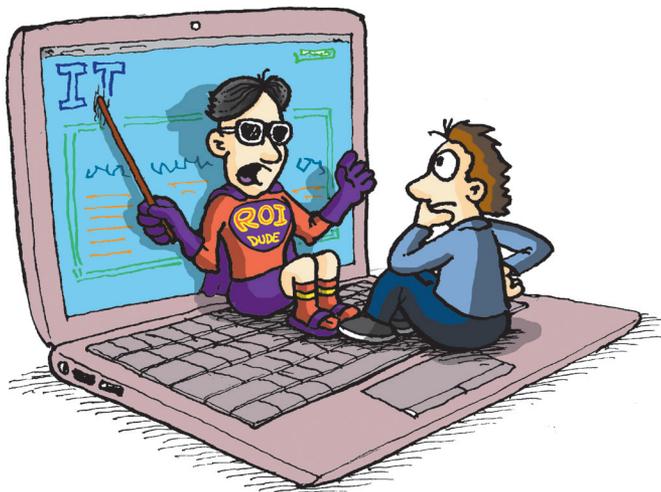
Many CIOs manage their IT portfolios much in the same way as a hedge fund manager or venture capitalist manages a financial portfolio. Rather than financial assets, the CIO oversees infrastructure, applications, and projects. When she buys infrastructure, a CIO captures the depreciation as operating expense. This contrasts with those CIOs who fail to properly budget and operationalize predictable expenses such as the five-year legacy IT infrastructure upgrade cycle. The CFO tends to look unfavorably at sporadic requests for large sums of money.

There will likely be many stakeholders who want to review the ROI analysis including technical IT staff, IT leaders, the CTO and CIO, the CFO and perhaps other senior management or Board members. While the analysis needs to address the concerns of all the stakeholders, it particularly needs to support the CIO in her mission of utilizing technology to help digitally transform the organization. The analysis should help justify an expenditure on disruptive infrastructure by showing the projected financial impact of each alternative on business outcomes. This may include tying the expenditure to increased revenue growth or to customer retention.

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# TIP 05

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*If your customer tells you he focuses on cost per GB,  
you know you have a lot of educating to do.*

In this chapter, we discussed how a CIO can use financial analysis to address the twin biases of status quo and public cloud. We start off Part II of this book with Chapter 6 diving into the analysis process. But, first, we'll wrap up Part I with a review of financial basics.

# 05

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# Financial Basics

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*“Gentlemen, this is a football.”*

**Vince Lombardi**



This chapter is geared to anyone interested in financial analysis, but is either lacking a finance background or simply looking for a refresher. It should also be helpful for those lacking experience in putting together a TCO or ROI analysis. If you don't fit into any of these categories, you may wish to skip ahead to the next chapter.

## Financial Statements



**Figure 5-1: A Simplified Business Cycle**

*Figure 5-1* shows a very simple business cycle: The business acquires raw materials which it then improves through an operating process and sells for a profit. It then uses some of the proceeds to purchase more raw materials. Raw materials don't have to be actual items such as lumber or iron, they can be labor, or data or patients, and so on.

The way a business keeps track of the business cycle, both for itself and for its investors, is through the use of financial statements.

There are three primary, and interdependent, parts of financial statements: The Income Statement, Balance Sheet and Cash Flow Statement.

## Income Statement

The Income Statement (also known as a Profit and Loss Statement, Operating Income Statement, etc.) shows a company's profitability over a period of time. The statement starts with sales or revenue and is reduced by all costs incurred by the business to determine the net income generated at the end of the term.

*Figure 5-2* shows an example of an income statement. The Income Statement contains major sections. Note, some variation will occur between businesses, but in general the income statement contains the following sections:

- **Operating Section**

- **Gross profit:** Sales and revenue including the cost of goods or services sold. The costs are reduced from the sales and revenue to determine the gross profit generated by the business.
- **General operating costs:** Costs of operating the business. These costs include both cash-based expenses and non-cash-based expenses (such as depreciation and amortization). Subtracting the general operating costs from the gross profit determine the operating profitability of the business.
- **Interest:** This section shows expenses related to interest being paid by the business related to financing or borrowing money to support operations.
- **Taxes:** Federal, State and local government taxes based on profits and earnings.
- **Net Income:** Profits generated by the business after all costs and taxes have been reduced from sales and revenue.

## Income Statement for Example Company, Inc.

Sales	\$2,000,000	
Cost of Goods Sold	\$1,200,000	
<b>Gross Profits</b>	<b>\$800,000</b>	OPERATING SECTION REPORTS BUSINESS' REVENUES AND EXPENSES FROM PRINCIPAL OPERATIONS
<b>Operating Expenses:</b>		
Salaries	\$160,000	
Rent	\$60,000	
Utilities	\$20,000	
Depreciation	\$80,000	
<b>Total Operating Expenses</b>	<b>\$320,000</b>	
<b>Operating Profit (EBIT)</b>	<b>\$480,000</b>	← COST OF FINANCING (INTEREST)
Interest Expense	\$60,000	
<b>Earnings Before Taxes</b>	<b>\$420,000</b>	
Taxes	\$147,000	← TAXES
<b>Net Income</b>	<b>\$273,000</b>	← NET INCOME

**Figure 5-2: Sample Income Statement**

### Profit Margins

Different profit margins are used to measure a company's profitability at various cost levels, including gross margin, operating margin, pretax margin, and net profit margin. The margins shrink as layers of additional costs are taken into consideration, including cost of goods sold (COGS), operating and non-operating expenses, and taxes paid. Gross margin measures how much a company can mark up sales above COGS. Operating margin is the percentage of sales left after covering additional operating expense. The pretax margin shows a company's profitability after further accounting for non-operating expense. Net profit margin concerns a company's ability to generate earnings after taxes.

## Net Profits

Profits, also known as net income or the bottom line, are the difference between sales and cost of goods sold minus operating expenses, interest expense, taxes, and depreciation. Most infrastructure-based TCO and ROI analyses will not extend directly into the business profits. However, understanding profits helps the analyst frame the financial narrative and impacts based on findings of an infrastructure-based TCO or ROI.

## Depreciation

Depreciation is the accounting practice of writing off tangible assets over their useful lives. Astute analysts should incorporate depreciation into scenario valuations, but depreciation is not a period cash cost – it is a conversion of assets off the balance sheet as expenses incurred by the business. The goal within the analysis and financial narrative is to determine the efficiency of capital assets, and depreciation serves this purpose well. Increases and decreases in depreciation provide a measuring mechanism to determine how efficiently assets are being used within the business. A straight-line method of dividing capital costs equally by months of useful life generally suffices to show depreciation impacts in an ROI analysis.

## Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA)

One of the most common metrics for better understanding profits is Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA) which removes these costs from profits. Note, businesses may have variations of EBITDA that include or remove other expenses leading to alternative variations; for example, EBT (Earnings Before Taxes) and EAT (Earnings After Taxes). Understanding adjustments made by the business can be very useful in understanding how decisions made will impact profitability performance.

Private equity owned companies tend to care most about shorter-term performance. The owners typically have a 3-5-year time horizon.

They seek to make a quick return on their investment by improving performance and then selling the company. Most of their acquisitions are measured primarily on EBITDA.

### Balance Sheet

The Balance Sheet is a financial statement that summarizes a company's assets, liabilities, and shareholder/owner equity at a given point in time.

- **Assets:** Things which have value and are owned by the company.
- **Liability:** Debt to non-equity holders such as bank loans, accounts payable (money owed to vendors for services), and money owed to employees for payroll.
- **Equity:** Debt to investors – those who maintain an ownership stake in the company.

Figure 5-3 shows an example of a Simple Balance Sheet.

### Example Company Balance Sheet (In Millions)

Current Assets		Liability and Equity	
Cash and Cash Equivalents	\$1,806	Accounts Payable	\$2,738
Accounts Receivable	\$705	Short-Term Debt Liabilities	\$640
Inventories	\$2,476	Long-Term Debt	\$4,642
Other Current Assets	\$92	Other Non-Current Liabilities	\$820
<b>Total Current Assets</b>	<b>\$5,079</b>	<b>Total Liabilities</b>	<b>\$8,840</b>
<b>Property &amp; Equipment</b>	<b>\$6,567</b>		
<b>Other Assets</b>	<b>\$694</b>	<b>Total Stockholder's Equity</b>	<b>\$3,500</b>
<b>Total Assets</b>	<b>\$12,340</b>	<b>Total Liabilities and Equity</b>	<b>\$12,340</b>

Figure 5-3: Example of a Balance Sheet

The balance sheet assets are ordered by level of liquidity, meaning ease of ability to convert the asset into cash. Assets considered liquid are convertible within one year. Liquid assets typically include cash, short-term bonds or investments, inventory assets and the like. Longer term assets are generally called Fixed Assets. Fixed assets typically include plant and equipment, buildings, and longer-term investments.

Businesses have the option to use various forms of debt or liabilities to finance the operations of the business. Similar to assets, liabilities are listed in order of liquidity. Shorter-term loans are shown first, and longer-term debt shown later.

Shareholder Equity represents the total contribution and ownership interest of shareholders or owners of the business.

The balance sheet should be in balance between the assets and liabilities plus shareholder equity. Obviously, anything out of balance is cause for concern. However, understanding how the business' assets are funded can enhance the financial narrative. Comparing the liabilities to equity provides understanding of the business' tolerance for leveraging debt to increase its return or profitability to shareholders known as Return on Equity (ROE).

### **Statement of Cash Flows**

The Statement of Cash Flows shows how changes in Balance Sheet accounts and income affect cash and cash equivalents. In short, it shows the cash moving through the business. The statement of cash flows has three major sections: Cash flow from business operations, cash flow from investment activities and cash flow from financing activities.

One of the most important cash flow metrics, especially for investors looking at publicly traded companies, is Free Cash Flow. Free cash flow provides a measure of profitability excluding non-cash income statement expenses and including spending on equipment and assets as well as changes in working capital.

Figure 5-4 shows an example of a Statement of Cash Flows.

### Example Corporation Statement of Cash Flows

#### Cash Flow from Operating Activities

Net Income	\$35,000,000	BUSINESS OPERATIONS
Add Depreciation Expense	\$16,000,000	
Increase in Accounts Receivable	(\$18,000,000)	
Decrease in Accounts Payable	(\$17,000,000)	
Decrease in Inventory	\$21,000,000	
Cash Provided	\$37,000,000	

#### Cash Flow from Investing Activities

Capital Expenditures	(\$40,000,000)	INVESTMENT ACTIVITIES
Proceeds from Sale of Property	\$12,000,000	
Cash Provides	(\$28,000,000)	

#### Cash Flow from Financing Activities

Long-term Debt	\$25,000,000	FINANCING ACTIVITIES
Cash Dividends	(\$10,000,000)	
Purchase of ST Securities	(\$5,000,000)	
Cash Provided	\$10,000,000	

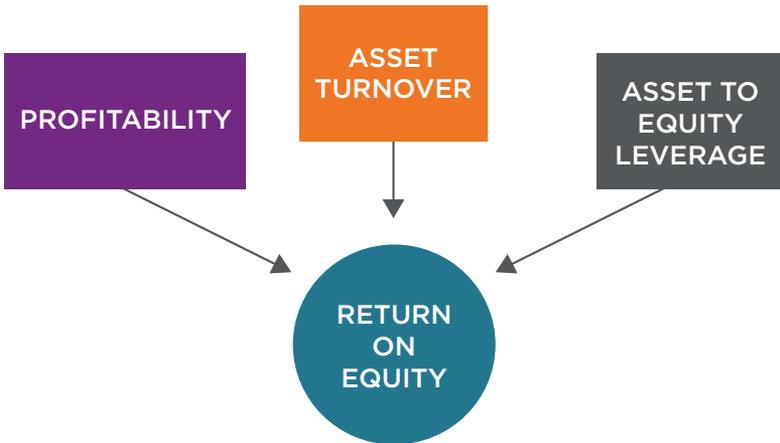
Net Increase in Cash	\$19,000,000	NET CASH RESULTS
Cash at Beginning of the Year	\$20,000,000	
<b>Cash at End of the Year</b>	<b>\$39,000,000</b>	

Figure 5-4: Example of a Cash Flow Statement

## The Main Focus of the Business

Investor-funded companies typically start with a business idea. Investors seeking a return on their investments put money into the company as capital to get started, becoming initial equity owners of the business. The invested money is initially transferred to cash under assets and converted (through purchases) into other assets including

raw materials or inventory. This cash also provides an ability to begin the operating processes that will generate more cash by creating value from the raw materials. The goal of the business is to drive value back to equity owners of the business.



Executive management has essentially 3 levers that they can use to maximize the business' return on equity (ROE): Profitability, Asset Turnover, and Asset to Equity Leverage. Changes within one of these levers will impact ROE positively or negatively and may impact other levers. For example, moving assets from ownership to an operating lease may increase asset turnover while reducing profitability. It is key to the financial story to show how each solution increases or decreases profitability, affects asset turnover, and impacts equity leverage - ultimately impacting ROE.

### Profitability

Profitability results from generating greater profits through charging a premium on goods sold. Profitability is an income statement metric. Most often, profitability will not be directly referenced within a TCO, but it may be part of the story within an ROI analysis. An efficient and

agile software-defined IT infrastructure lowers the cost of operations, resulting in an increase in profitability. A common metric used within businesses to show this efficiency is revenue generated per employee. A reduction in employee cost for the same revenue will increase this profitability measurement. As a part of a profitability narrative the analysis can provide insights into the reinvestment of employees to revenue-generating activities.

### **Asset Turnover**

**Asset Turnover is measured by two primary variables:**

Return on Assets and Asset Turnover Ratio.

### **Return on Assets (ROA)**

Profitability is assessed relative to costs and expenses, and it is analyzed in comparison to assets to see how effective a company is in deploying assets to generate sales and eventually profits. The term “return” in the ROA ratio customarily refers to net profit or net income, the amount of earnings from sales after all costs, expenses and taxes. The more assets a company has amassed, the more sales and potentially more profits the company may generate. As economies of scale help lower costs, create asset utilization efficiencies, and improve margins, the return may grow at a faster rate than assets, increasing the Return on Assets Ratio.

Efficient software-defined IT infrastructures greatly impact the return on assets through minimizing depreciation leakage and waste. Traditional infrastructures require larger assets that operate underutilized for several quarters. Consider, for example, a 300 TB storage array that serves only 100 TB during the first 2 years of its use. The depreciation of the remaining 200 TB of storage is considered depreciation waste during those 2 years - impacting return on assets by inflating depreciation unnecessarily. Having the ability to seamlessly grow storage using

software-defined infrastructure reduces the 200 TB waste from the first 2 years, increasing the return on assets lever.

### **Asset Turnover Ratio**

The Asset Turnover Ratio equals Revenues/Total Assets. It represents the value of a company's sales or revenues generated relative to the value of its assets. Generally speaking, the higher the asset turnover ratio, the better the company is performing since higher ratios imply the generation of more revenue per dollar of assets. The asset turnover ratio is commonly used as an indicator of the efficiency with which a company is deploying its assets in generating revenue.

### **Asset to Equity Leverage**

Leverage is the investment strategy of using borrowed money – specifically the use of various financial instruments or borrowed capital to increase the potential return of an investment. Leverage can also refer to the amount of debt used to finance assets. When one refers to something (such as a company, a property or an investment) as “highly leveraged,” it means that item is financed more through debt than equity.

Strategic use of debt can increase Return on Assets/Equity by using lenders' money. It enables management of cash flow to coincide with asset consumption. Debt also incurs interest expense which then increases the cost of operations, decreasing profits.

Debt structures commonly seen within TCO and ROI analyses include the operating lease, which is off the books as well as the capital Lease which is a financed purchase. However, leverage can also refer to debt not directly associated with assets. These debts are leveraged against the business itself and include corporate bonds, bank loans, revolving debt accounts, etc. The debt leverage narrative within an ROI narrative is typically limited to asset procurement leasing and financing.

## Financing

Companies often raise debt funding in bulk via bond issues once a year, or even once every two to three years. This raises cash for longer term investments (e.g., CapEx). This is a reason why companies maintain CapEx budgets. If they raise too much debt they may be considered “riskier” companies, which could negatively impact their external credit rating. If their credit rating goes down, their cost of borrowing will increase, as the lenders will want a higher return to cover a perceived higher risk.

The common types of financing associated with infrastructure include: Operating Lease, Capital Lease and Installment Payment Agreement.

### Operating Lease (FMV)

In an operating lease, the lessor (funder) holds the title. No bargain purchase option (such as a \$1 buyout) exists. The lease term is less than 75% of the asset’s expected useful life.

### Capital Lease (\$1 Out)

In a capital lease, the customer holds the title. A bargain purchase option (such as a \$1 buyout) exists. The lease term is greater than 75% of the asset’s expected useful life.

### Installment Payment Agreement (IPA)

An Installment Payment Agreement (IPA) refers to an agreement where a customer makes installment payments over time. Ownership of assets transfers to lessee.

## Cost of Money

Also known as the Weighted Average Cost of Capital (WACC), Cost of Money is a blended rate between Cost of Debt and Cost of Equity.

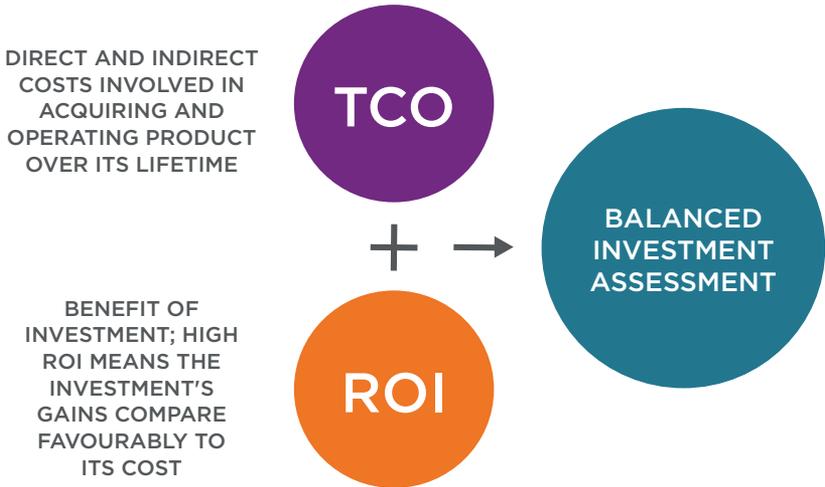
$$\begin{aligned}
 & \text{COST OF DEBT} \times \left[ \frac{\text{DEBT}}{\text{DEBT} + \text{EQUITY}} \right] \\
 & + \\
 & \text{COST OF EQUITY} \times \left[ \frac{\text{EQUITY}}{\text{DEBT} + \text{EQUITY}} \right] \\
 & = \\
 & \text{WACC}
 \end{aligned}$$

WACC is typically used in determining discounted cash flow of investments within the business. Businesses are often interested in discounted cash flow and, simultaneously, lack a clear understanding of how it impacts the narrative and ROI analysis. While valuable and important to the narrative, sometimes discussing WACC and discounted cash flow with IT business managers and analysis audiences can distract from the main message of the analysis. Understanding the audience and what is necessary to build the ROI story is critical when discussing discounted cash flows.

Decision-makers considering disruptive technology generally seek a much lower disruptive solution cost to compensate for perceived risk and operational changes. This delta versus the status quo tends to not be significantly affected by applying discounted cash flow. If the organization is interested in seeing a discounted cash flow, but doesn't have a good handle on its WACC, we typically use 10%.

## ROI Versus TCO

While you won't find return on investment (ROI) or total cost of ownership (TCO) metrics as part of an organization's financial statements, they are indispensable methodologies for quantitatively evaluating different options in the IT industry. Many analysts use the terms interchangeably – and I am guilty of some of that in this book. While there can be a lot of overlap, typically the use case defines the best metric.



### ROI

Return on Investment (ROI) measures the projected net return over a number of years versus the initial investment. An advantage of ROI is the ability to easily incorporate business value such as increased revenues or cash flow as part of the results. ROI is a common metric used across most industries and is a great tool for comparing costs and benefits.

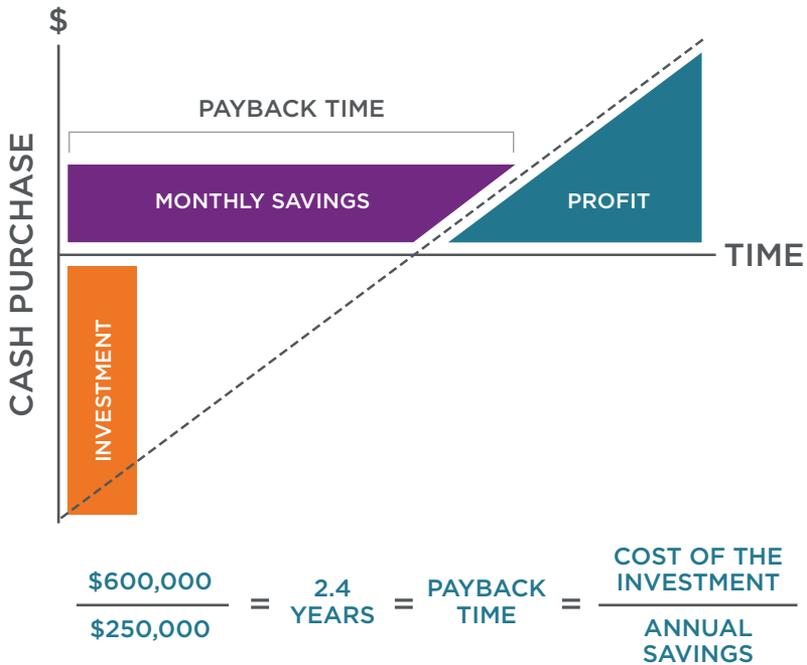
In the technology industry, ROI analyses are commonly utilized when an organization is considering implementing a net-new project or technology. The ROI identifies the real costs associated with the project, the opportunity costs exposed by the project, and the overall return. The ROI is calculated by dividing the sum of the annual savings or other benefits (i.e., increased revenue) over the analysis period by the cost of the investment.

$$\frac{\text{GAIN FROM INVESTMENT} - \text{COST OF INVESTMENT}}{\text{COST OF INVESTMENT}} = \text{ROI}$$

In the majority of cases, a disruptive infrastructure initiative kicks off with a pilot, then a beta and then production. While somewhat arbitrary, I find that it generally works best to consider all of the upfront CapEx and associated installation costs projected to be born in Year 1 as the investment. Increased infrastructure expenditures in following years – along with associated operating expenses – are deducted from the projected benefits, thereby lowering the return.

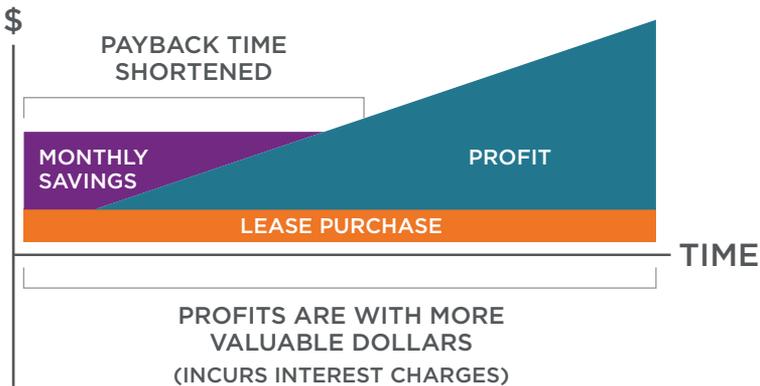
**Payback Period**

The Payback Period (also known as the Payback Time) is a common metric associated with an ROI analysis. The payback time reflects the Cost of the Investment divided by the annual savings enabled by the investment. *Figure 5-5* shows a payback period of 2.4 years calculated by dividing the \$600,000 investment by the \$250,000 in annual savings. Of course, if the annual savings varies by year, then the payback calculation requires more arduous means.



**Figure 5-5: Simple Payback Calculation**

If an organization finances its infrastructure, and the interest expense for a financing agreement is less than the percentage savings achieved from purchasing disruptive infrastructure, then financing shortens the purchase payback period as shown in *Figure 5-6*.



**Figure 5-6: Shortened Payback Period Due to Financing**

### Internal Rate of Return (IRR)

Internal Rate of Return (IRR) is another variable commonly associated with an ROI analysis. Wikibon [defines](#)<sup>1</sup> IRR as: “The annualized effective compounded return rate that sets the net present value of all cash flows (both positive and negative) to zero.” For example, if an ROI analysis has an IRR of 67%, you’d have to earn 67% annually in order to equal the savings you would have achieved from purchasing the disruptive infrastructure. In practice, IRR is typically used to rank and compare investment opportunities.

#### **Case Study: Bank ROI**

Figure 5-7 shows the projected 5-year summary ROI of the analysis I prepared for converting 269 physical servers of a well-known regional bank to virtual machines running on Nutanix. The \$873,404 Investment reflected the first-year cost for Nutanix software, VMware software and associated servers and planning and deployment services. The \$83,431 in Year-1 costs under the Virtual scenario reflected the OpEx. Years 2 – 5 include the projected CapEx and OpEx for each year.

Total projected 5-year costs for the physical scenario came to \$11,325,626 vs. \$1,916,219 for the virtual scenario for a cash flow savings of \$9,409,406. This equates to an ROI of 1,077%, a 4.9-month payback and an IRR of 240%. These are, of course, compelling numbers and, when combined with the narrative of the full ROI analysis, led the bank to move forward with its virtualization project.

The Sr. Vice President of Corporate IT Administration for the bank remarked during an interview on The Cube, “We were within 3% - 5% of everything that came out of our [ROI] study. After three years, we’re 97% [of all workloads] on Nutanix.”

### Aggregated Financial Metrics

Year	Physical Costs	Virtual Costs 3-Tier	Virtual Costs Nutanix	Delta (3-Tier) vs. Nutanix
Investment	-	\$1,149,107	\$873,404	\$275,703
Year 1	\$2,232,427	\$237,569	\$83,431	\$154,138
Year 2	\$2,248,776	\$298,309	\$298,927	(\$618)
Year 3	\$2,265,125	\$252,269	\$192,365	\$59,904
Year 4	\$2,281,474	\$311,790	\$199,715	\$112,076
Year 5	\$2,297,823	\$347,818	\$268,379	\$79,440
<b>Total</b>	<b>\$11,325,626</b>	<b>\$2,596,862</b>	<b>\$1,916,219</b>	<b>\$680,643</b>
<b>ROI</b>		<b>760%</b>	<b>1077%</b>	
<b>Payback</b>	-	<b>6.9 Months</b>	<b>4.9 Months</b>	-

Figure 5-7: Summary ROI for the Bank

## TCO

Total Cost of Ownership (TCO) measures the lifecycle costs of two (or more) alternatives. Popularized by Gartner, TCO is a common tool in the technology industry utilized to compare two or more solutions - typically within the context of an approved project or existing technology. The TCO projects both capital and operating costs of each alternative over a defined period of time, usually 3-5 years.

### Common TCO Methodologies

There are multiple common TCO methodologies used by financial analysts in technology. Each method provides benefits and drawbacks. These are important to understand at a high-level when determining accuracy of any TCO analysis. For purposes of brevity, three are outlined below:

#### ***Pound for Pound Method***

Pound for Pound seeks to match components within technologies as closely as possible to ensure the same hardware is being considered. For example, if a CPU or Raw GB storage in one system contains a specific CPU, the other system must contain the exact same CPU or Raw GB storage.

- **Benefit:** The benefit of this method is that it is easily completed and provides accurate depiction of TCO costs when the comparisons are of a fungible nature, such as two comparable servers providing the same core function.
- **Drawback:** The drawback occurs when comparing technologies that are fundamentally different, for example, comparing public cloud with metered consumption costs to fixed-cost servers. The method does not consider potential use cases, constraint limitations, and potential optimizations between solutions. This can result in inaccurate and unreliable cost analysis.

### ***Depreciation Utilization Method***

This method is highly common within IT and attempts to assign an easily understood cost to each unit of measure, i.e., applying a cost per GB based on Raw or Usable GBs available within a storage system by dividing the cost of the system by the total GBs available and estimated use of technology (depreciation schedule). Costs are either applied as a monthly cost based on monthly utilization or as a single cost when estimated use of technology is not included.

- **Benefit:** This method is very easily understood and provides a single cost number. Historically, this method is used to compare very similar systems - perhaps most commonly with storage systems where disk capacity is often available within the invoice.
- **Drawbacks:** There are two major drawbacks to this method: Hidden capital and depreciation waste, and improvements in software creating varying efficiencies based on workloads. Hidden capital and depreciation occurs due to the need to purchase greater capacity of upfront SANs to provide for unknown future growth. This waste leads many companies to the public cloud or HCI to reduce upfront capital costs. The second drawback is due to improvements in virtualization density (algorithms, hardware improvements), storage efficiencies (algorithms, deduplication, compression, hardware improvements), which may vary depending on workload characteristics. These hardware and software efficiency gains become very challenging to fully determine without understanding the supported workload.

### ***Use Case Method***

All the TCO examples in this book utilize the Use Case Method of TCO, which seeks to determine a use case and provide technology solutions and associated financial analysis to procure and operate each solution. For example, servers with external storage can be compared to enterprise or public cloud options even though they are very different approaches to solving the IT needs for the business.

- **Benefit:** This method allows for dissimilar technologies to be accurately compared. Each technology is optimized to solve the same use case utilizing the distinct benefits provided within the different technologies.
- **Drawback:** While this method may be highly accurate, it can be challenging to develop the model. Many will abandon this method due to difficulty in determining how or when new products need to be purchased. The level of effort to optimize and price dissimilar technologies requires a deep level of understanding of the technologies to provide proper modeling.

Regardless of the method chosen within an analysis, it is critical to include all costs of procurement and operation. Many technologies will have very low acquisition costs, but tremendous operating costs. Considering acquisition or entry costs as the sole determining purchase factor is highly misleading. Therefore, it becomes critical to understand all the costs associated with the technology to avoid reducing cost in one area only to incur more in another.

### **TCO Case Study: Fairway Independent Mortgage Company**

With \$27.6B in 2018 loan originations, Fairway Independent Mortgage is one of the largest mortgage lenders in the U.S. and also one of the fastest-growing the past several years. In 2014, the CIO told me that he wanted to deploy Citrix XenApp for all of his employees. At the time, he was getting ready to purchase a second Vblock, a so-called “converged infrastructure” solution packaging compute, storage, and networking together, because his first Vblock was already at capacity after only a year. But after piloting the Nutanix software-defined infrastructure, he asked for a TCO analysis comparing Nutanix versus buying a second Vblock.

The TCO was a very simple analysis where I incorporated the upfront cost of both the Vblock and Nutanix scenarios, the projected upgrade costs over five years as well as rack space, power, cooling, and administration cost.

As part of the TCO analysis, we presented the following summary shown in *Figure 5-8* projecting five-year savings of \$928,018 under the Nutanix scenario. At that point, the CIO said, “Not only are we not going to purchase the second Vblock, we’re going to sell our first Vblock and put all of our workloads on Nutanix.” But although the Vblock had a list price of over \$750,000 when they purchased it a year earlier, they could only get \$27,000 for it on the secondary market – it turns out, no one wants to buy a used proprietary array. They instead moved all the important workloads to the Nutanix solution and relegated the Vblock to non-important work until fully depreciated.

**TCO: Vblock vs. Nutanix**

Year	vBlock 320	NX-6260	Net Cash Flow	TCO Reduction %
Year 1	\$600,612	\$310,724	\$289,888	-
Year 2	\$164,612	\$80,149	\$84,484	-
Year 3	\$174,612	\$6,036	\$168,576	-
Year 4	\$260,560	\$40,056	\$220,504	-
Year 5	\$285,560	\$120,973	\$164,588	-
<b>Total</b>	<b>\$1,485,956</b>	<b>\$557,937</b>	<b>\$928,019</b>	<b>62%</b>

**Figure 5-8: Fairway Independent National Mortgage TCO Summary**

## Other Important Financial Terms

Other important financial terms to know as part of an ROI/TCO analysis include: Capital Expenses, Operating Expenses, and Net Present Value.

### **Capital Expenses (CapEx)**

Capital Expenses (CapEx) is commonly found on the statement of cash flows under Investments. CapEx, in the context of an infrastructure-based ROI or TCO analysis, are the funds used to procure or upgrade the organization's hardware and software infrastructure components, including set-up costs directly associated with the solution. From an accounting standpoint, CapEx cannot be fully depreciated in the year in which it is paid or incurred.

### **Operating Expenses (OpEx)**

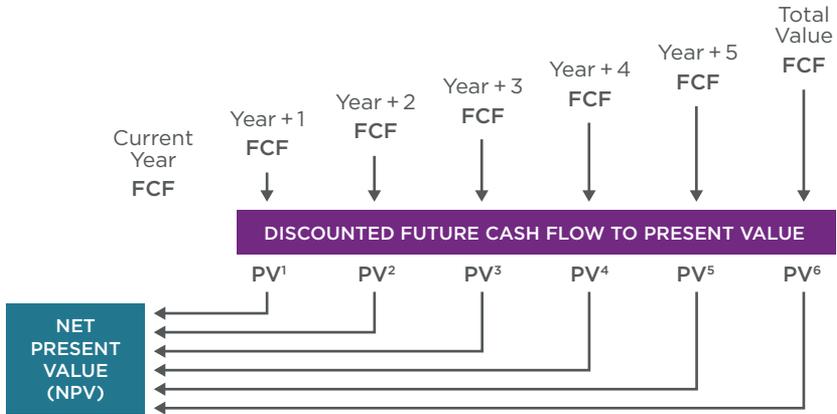
Operating Expenses (OpEx), in the context of an infrastructure-based ROI or TCO analysis, is the ongoing cost for running the hardware and software components. This cost includes rack space, power, cooling, administration expense, and support.

### **Net Present Value (NPV)**

NPV, which shows the time value of money, is the discounted value of the future projected cash flows. The idea is that cash flows in the future carry less value than cash flows today. As shown in *Figure 5-9*, the higher the discount rate (the firm's WACC), the more the financial weight assigned to near-term cash flows. NPV is commonly used by investors to help determine the valuation of a company. They will discount the future predicted post tax cash flows at the WACC to determine a present-day market valuation of the company. An investment that delivers a positive NPV is likely to add value to (i.e., increase) the overall market valuation.

$$NPV = \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \dots + \frac{CF_n}{(1+r)^n}$$

*CF* = Cash Flow  
*r* = Discount Rate



**Table 5-9: NPV Calculation**

Taking the time to become familiar with the language of business will help immensely in putting together a financial analysis that resonates with the C-level suite and with the business units.

Part II of this book shows how to prepare and present a compelling ROI story.

# PART II

## Building a Compelling Financial Analysis Story

In Part II, we undertake the process of building a compelling ROI story, starting with the analysis process itself. We then discuss the importance of establishing ethos, or trust, both for the analyst and for the disruptive technology. A chapter on logos covers the numbers of an analysis, including negotiating unknown variables with the customer. We discuss storytelling in general, and how to both build and present a compelling financial narrative. Part II concludes with a discussion on Customer Success and includes several case studies of Nutanix Customer Success accounts.

**Semantics Note:** I expect that many, if not most, readers of this book will be primarily interested in providing internal analyses for their employers. I nevertheless encourage you to think of the engagement as if you were providing consulting services for a customer. This will help you maintain a focused mindset and a rigorous methodology. In that spirit, I refer to the organizations undergoing a TCO or ROI analysis as “customers.” Unless otherwise specified, I assume that the reader is the analyst driving the analysis.

# 06

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## The Analysis Process

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*“The best TCO analysis is the one  
you don’t have to do.”*



Our Customer Success (CS) Finance team regularly receives requests from Nutanix sales reps for copies of ROI or TCO analysis reports with identifying customer information removed. Their intent is to share the sanitized report with a prospective customer, typically in the same industry, to provide them with an idea of what their results might look like if they deploy Nutanix HCI.

We discourage this practice. When it comes to embracing disruptive infrastructure, looking at someone else's report as opposed to engaging in a customized financial analysis lowers the probability of moving forward. Assuming the prospect's IT leaders even take the time to read the report, they tend to believe that their environment and circumstances are unique. Without going through the analysis process, they are more likely to be skeptical of both the results and of the analyst.

Occasionally, we run across a very different scenario. We'll be working our way through a financial analysis comparing Nutanix HCI vs. alternative architectures when the prospective customer will have an "ah ha" moment. As she learns more about the technology during the analysis process, she realizes that it is precisely the right solution to meet her objectives. Or perhaps she'll intuitively grasp the overwhelming operational savings as compared to alternative approaches. As a result, she is ready to move forward with HCI without even completing the effort to quantify the projected costs and savings.

I recommend going through the analysis process regardless. It does much more than enable the analyst to gather data, it serves as a process of discovery for the customer. She obtains both a better understanding of the operational costs of her status quo environment as well as the differentiators of the disruptive solution. This understanding builds confidence, which in turn helps counteract the natural perceived risk of new technology. Most importantly, the analysis should prompt the IT staff to think about their organization's business objectives and how they are likely to be impacted by each infrastructure alternative.

Ultimately, the analysis findings can help shape the underlying project itself. Preconceived ideas of how to configure and deploy disruptive infrastructure solutions are augmented, or even replaced, by a design optimized to reduce the costs and maximize the benefits uncovered by the analysis process.

## Analysis Determinants

Many factors help shape a financial analysis. Two of the most important are the storyteller (analyst) and the audience (customer).

### The Analyst

The analyst, like any storyteller, will shape her analysis based somewhat upon her unique experience, agenda, and, of course, source of employment. Some typical analyst roles and motivations include:

- **CIO/IT Leader:** Looking to decide what infrastructure solution to implement and/or to justify the desired option.
- **IT Staff Member:** Looking to decide what infrastructure solution to implement and/or to justify the desired option.
- **Channel Partner:** Looking to justify its preferred solutions and help the customer decide what infrastructure solution to implement.
- **Outsourcer/SI:** Looking to justify (both internally and to the customer) the cost of outsourcing part or all of the customer's IT operations.
- **Cloud Provider:** Looking to justify moving applications, test/dev, or infrastructure to the cloud.
- **Consultant:** Helping the customer decide what infrastructure solution to implement and/or to justify desired option.
- **IT Manufacturer:** Justify its solution and help the customer decide what infrastructure solution to implement.

Regardless of the analyst employer, the analysis process should be a consulting engagement reflecting a rigorous methodology – and this is true whether it is an internal or external exercise.

## **Intended Audience**

As an analyst, structure the analysis process with the audience in mind.

## **Internal Champion(s)**

Organizations running legacy infrastructure may resist entertaining disruptive solutions for all the reasons mentioned in Chapter 2. It typically takes an internal champion to push back against the status quo proponents. This individual (or individuals) might be a staff member or an executive. Perhaps she deployed the solution at another organization or maybe researched it following a recommendation.

Favorable analysis results bolster the internal champion's willingness to take on both the effort and political risk of advocating on behalf of a disruptive infrastructure solution. She will, hopefully, coach you during the analysis process regarding information such as how decision-making is made within the organization, what are the IT and business hot buttons, and what impact the analysis is likely to play in the decision-making process. She can also help identify the actual decision-makers, influencers, and the relevant Finance representatives.

## **Antagonists**

Seek status quo defenders and, wherever possible, shape the analysis to help address their concerns and possibly even win them over to the new technology.

## **Decision-Makers**

It is a good practice to try and get an agreement to present the results to a senior IT executive (or even senior business executives). This will both help ensure greater cooperation from the IT staff, stakeholders, and other influencers as well as provide an increased probability that the conclusion will be seriously considered.

## **Finance Department**

Always try to meet with a representative from either IT Finance or Corporate Finance early in the analysis process. The representative

can help shape the analysis in the format that the department likes to see. Continued collaboration during the analysis helps ensure Finance buy-off prior to presenting the results to the ultimate decision-makers. Bypassing Finance runs the risk of needing to rework the numbers later.

## Analysis Scope

Determining the analysis scope is typically one of the most challenging aspects of a financial analysis engagement. While the initial project typically defines the breadth of its corresponding financial analysis, the larger the scope the better in terms of helping clarify a big-picture, long-term strategy. On the other hand, a scope that encompasses a much larger infrastructure than what is required for the immediate project may prove too unwieldy to gather all the pertinent information required to put together a relevant report.

## Analysis Categories

Figure 6-1 shows a typical workflow that our team follows when conducting a financial engagement with a customer.



**Figure 6-1: A Typical Nutanix Financial Analysis Workflow**

A wide-ranging financial analysis can require a significant time commitment from an IT department that may already be resource

constrained. Fortunately, less intensive analysis levels can still provide very helpful results. The Nutanix CS Finance team categorizes analysis types ranging from, “throw an analysis over the wall and see if anyone notices,” to an extensive engagement and collaboration with the customer that can last for months. These categories include: Value Hypothesis, Express Value Study, Solution Value Study, and Comprehensive Value Study.

### Value Hypothesis

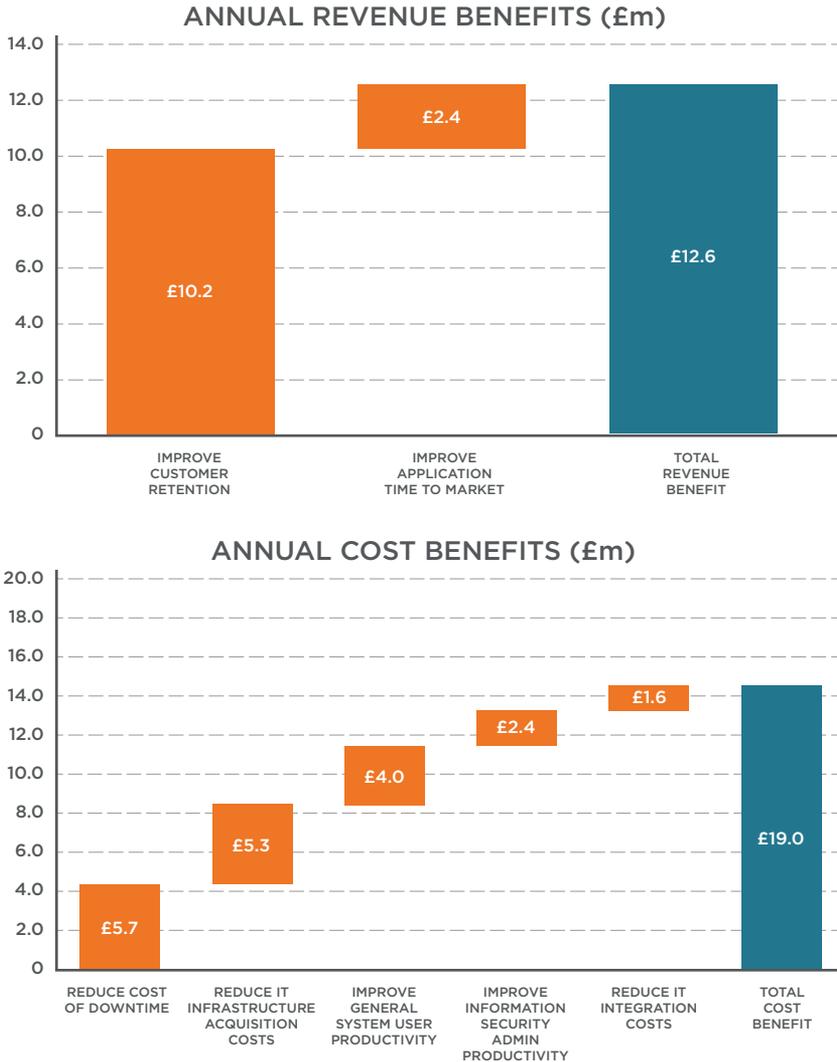
The prospect has expressed no interest in an analysis, and indeed might not know anything about the disruptive infrastructure. In this case, we put together a 1 or 2-page, “outside in,” graphically oriented analysis based upon publicly available information to try and pique someone’s interest. An example is shown in *Figure 6-2*. This procedure can also be used for engaging new departments at very large customers.

## Nutanix Drives a Range of Business Benefits

REVENUE BENEFITS	1	<b>Improve Application To Market</b>	Single Enterprise OS allows for the support of a variety of platforms (OEM options). Enterprise Native application orchestration and lifecycle management with Nutanix Calm enables applications to be easily deployed into private or public cloud environments.
	2	<b>Improve Customer Retention</b>	Nutanix’s excellence in customer support enables faster time to resolution; higher uptime; higher customer retention and protects brand reputation.
COST BENEFITS	1	<b>Reduce Cost of Downtime</b>	Web-scale Engineering allows for 1) 100% software defined that is highly resilient and self-healing, 2) Unlimited scale with linear performance.
	2	<b>Reduce IT Integration Costs</b>	HTML5 Single Pane of Glass: 1) Collapses multiple management interfaces. 2) Increases visibility across the entire stack. 3) Unified management spanning on-premise and multiple cloud environments.
	3	<b>Improve General System User Productivity</b>	Web-scale Engineering enables scalable performance with data locality and Flash for all workloads vs purpose-built silos thereby reducing network congestion and application latency.
	4	<b>Reduce IT Infrastructure Acquisition Costs</b>	1) Flexible Consumption Model - Choose between buying or renting (CAPEX/OPEX). 2) Enterprise Cloud Services - Better leverage existing deployments with new services and improved compute/storage densities.
	5	<b>Improve Security Admin Productivity</b>	Built-in Security - Security configuration Management automation for security self-healing helps in rapid audits and compliance remediation.

Figure 6-2: Outside In Analysis

**Based on HugeCo's own financial data this could drive £12.6m of annual revenue and £19m of annual cost savings if implemented across the Group**



Note: These benefits are an 'outside-in' estimate, indicative in nature and do not provide a guarantee of the outcome from an investment. The 'outside-in' estimates are based on company revenue and FTE count. Improvements in revenue, productivity and costs are derived from third-party benchmarks & benefits achieved by Nutanix customers.

**Figure 6-2: Outside In Analysis, Cont.**

## Express Value Study (EVS)

The analyst engages with the IT staff for a Q&A session – typically conducted remotely – lasting between 60 and 90 minutes. The analyst takes the input, creates a report based upon a template, and presents the results – often in a remote session as well. Adjustments are made as necessary, and a final, executive-level, report is produced and delivered. The engagement typically follows the framework shown in *Figure 6-3*.



**Figure 6-3: Express Value Study (EVS) Analysis Structure**

## Solution Value Study (SVS)

The analyst dives into the engagement, typically involving both remote and in-person meetings, over several days, weeks, or even months. In many cases, however, the analyst exposure – certainly at the beginning, is limited to the IT staff. This type of engagement requires a greater level of commitment from the customer, including executive sponsorship and project management. The engagement follows a similar structure as the ESV, but the Build phase is expanded to include

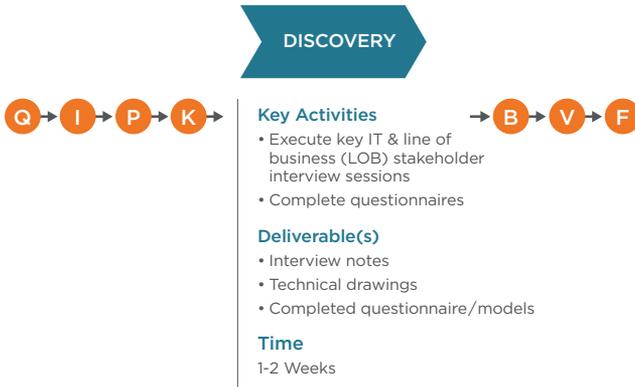
Planning, Kick-off, and a more formal Discovery process. The Validation phase typically takes place with the stakeholders who were engaged in the discovery process. The Final deliverable is presented, usually in person, to the Executive Sponsor. The engagement structure is represented in *Figure 6-4* (Q, I, V, F = Qualification, Invite, Validate, and Final from the ESV engagement depicted in *Figure 6-3*).



**Figure 6-4: Solution Value Study (SVS) Analysis Structure**

### Comprehensive Value Study (CVS)

A Comprehensive Value Study is the most extensive and formal engagement. It typically follows the structure of the SVS with the exception that the Discovery phase includes interviews with line of business executives and stakeholders in addition to the IT stakeholders. It will generally have one or more Executive Sponsors, ideally including the line of business. The expanded Discovery is depicted in *Figure 6-5*.



**Figure 6-5: Comprehensive Value Study (CVS) Analysis Structure**

## Preparing for the Analysis

Before beginning an analysis, even an express engagement, an analyst (assuming not an employee of the customer) must do her homework. This includes perusing the customer’s web site, reviewing earnings reports and industry analyst comments, discussions with knowledgeable external parties (such as sales reps), and so on.

Determine if the analysis will be an ROI, TCO, or perhaps a combination of both approaches. Establish who from the customer will provide the data for the analysis, and which stakeholders might be available for providing general information about the business and IT.

### Industry Vertical

Is the customer a manufacturer, a health care provider, retail, public sector, finance firm, etc.? Knowing the industry will help the analyst prepare ahead of time for common pain points. Retail firms, for example, tend to value uptime above all else - especially during the November and December holiday season. Other verticals might put

the highest emphasis on security. Some verticals require an industry vernacular, such as the Technology Business Management (TBM)<sup>1</sup> framework, commonly used in government. Large banks often have specific internal frameworks for evaluating infrastructure options that they may request the analyst utilize.

### Geography

Customer location can impact the relative importance of both hard costs and intangibles. Some regions, for example, have very high costs of power, making electricity savings particularly important. In some countries, labor – even skilled labor – is quite inexpensive, making administrative savings worth considerably less than in countries with a high cost of IT staff.

Some regions such as western Japan and Korea still have a generally high percentage of physical servers. In these situations, you may have to focus an analysis more toward the benefits of virtualizing the servers rather than comparing infrastructure solutions that assume widespread virtualization.

Some countries, such as India, have a reputation as being very focused on upfront costs and therefore difficult to approach with a bigger-picture analysis story. The CIO of a large Indian financial services organization was an exception to this stereotype. Here is his story.

*“Since 2007, we were a big VMware shop with Dell servers and EMC arrays, though we switched to Cisco UCS servers once they became popular. While India has a reputation for plentiful cheap IT labor, that is rapidly changing. We run a very lean and mean IT shop, and for that you need highly qualified people. They don’t come cheap. A key objective during our infrastructure refresh was to simplify everything about our environment - from the daily infrastructure administration tasks, to our virtualization platform, to managing our remote sites. We also wanted to make it easy for our developers to spin up and spin down VMs without involving the infrastructure team.*”

*“Nutanix’s financial analyst did a great job for us on the report. While the upfront costs of Nutanix were around \$300,000 higher than refreshing our 3-tier infrastructure, the overall TCO costs were much lower. We then augmented these results with an internal analysis that reflected the increased performance of Nutanix + AHV vs. our legacy stack. We found that our core SQL and Solaris-based applications ran 40% - 70% faster on the Nutanix stack. The result was an ability to shrink our overnight processing jobs to around 2 ½ hours. Because we were now able to get our clients a same day billings report, we were able to obtain a higher yield on our services in addition to increasing customer satisfaction.”*

### **Analysis Period**

A 5-year TCO model tends to best match the common depreciation cycle of IT assets (servers, network switches and storage). Five years is also a common refresh point.

### **Cost of Capital/Time Value of Money**

A financial analysis should discount cash flows back to present value, but I find that most customers do not know their cost of capital and, in any case, are not concerned with this metric. If the discrepancy is high enough, however, you may wish to consider including it. In either case, it is worth determining whether to use or not use discounted cash flows early in the analysis process.

### **Growth**

Most organizations expect to grow, either organically or through acquisition. At a minimum, they typically anticipate growing the use case under consideration. Yet most financial analysis tools evaluating 3-tier technology fail to account for growth. There is a reason for this. As explained in Chapter 4, legacy storage is limited in its scalability, meaning that accounting for growth typically increases both the TCO and risk of a 3-tier solution. Factoring growth into an analysis shows the stark economic contrast between 3-tier and HCI fractional consumption, as well as the latter’s elimination of the risk of an early forklift upgrade.

## Project Risk

All infrastructure projects, whether upgrading an existing SAN, migrating to public cloud, or deploying HCI, involve risk. With a status quo infrastructure, however, the customer decision-makers may feel that there is adequate in-house expertise to minimize any risk of downtime or performance-based problems. In other cases, such as migrating to public cloud, they may overlook the potential risks due to external pressures or other agenda imperatives.

Try to determine the likely emphasis on risk in the decision-making process to appropriately gauge the amount of time to be spent quantifying it. Identifying and, where possible, quantifying the risks of the different options helps reduce some of the angst and other emotional trigger points. This is typically going to require quite a bit of collaboration or negotiation between analyst and customer, along with creativity.

## Politics

As part of the collaboration process with customer employees, strive to uncover political agendas that are likely to impact either the analysis data gathering or the decision to act based upon the results. This process can also help identify and address politically related obstacles, such as shadow IT and technical debt.

## Cost Per VM

Unless assisting with a chargeback or showback model (see Chapter 10), I recommend staying away from this metric if possible. Cost per VM is, of course, an average, and averages can be misleading. I find it is generally much simpler and more informative to look at absolute costs and savings rather than dividing these numbers by what often turns out to be an arbitrary number of VMs. If a customer is insistent upon a cost per VM calculation, you can check out the formula I developed for a [Wikibon article<sup>2</sup>](#) on the topic in 2014.

### ***Cost Per Virtual Desktop***

Calculating the cost per virtual desktop entails all the negatives of cost per VM in general, but is even more misleading since it typically compares virtual desktops vs. physical desktops. This is largely an apples and oranges type of comparison – virtual desktops are very different from, and much more advantageous than, the physical alternatives. As with VMs in general, I recommend comparing absolute costs and savings between the two scenarios.

## Negotiating the Data

In many cases, particularly when evaluating a legacy 3-tier environment, customer representatives at the initial meeting will not know the answers to all the questions. They may lack sufficient knowledge of the many different environmental components, let alone the cost to support, manage, and upgrade them. A TCO analysis comparing two solutions is not very useful without the full and complete costs for both alternatives. But waiting until you can either meet with the right people or until the initial personnel find the answers may well mean you never get the analysis off the ground, let alone completed. The goal of the discovery session is to avoid process stall and to capture as much information as possible to keep the flow moving. The analyst can help move the process along by subtly negotiating with the customer.

Fortunately, perhaps the world's foremost expert on negotiation, Professor [Deepak Malhotra](#)<sup>3</sup> of Harvard University, is a long-time advisor of Nutanix. I've read a couple of his books on negotiation and had the opportunity to attend a few of his workshops sponsored by Nutanix for both employees and customers. Professor Malhotra's view of negotiation is that it is a process of communication that, done right, benefits both parties.

Suppose, for example, the IT staff is getting ready to upgrade to the latest 3-Par SAN as part of a legacy infrastructure refresh, but have

no idea what it will cost. Rather than risk being wrong, they may refrain from venturing a guess at all. To counteract this, you might say something like, “We tend to see that 3-Par SANs capable of handling your projected data requirements over the next several years tend to range between \$600,000 - \$750,000. I would think that in your case, because of the requirements you’ve specified, that you will be near the upper range. Can we use \$700,000 as a placeholder and then go back and adjust if necessary?”

By suggesting a number within a given range, you leverage a concept known as “anchoring.” Professor Malhotra describes an anchor as, “A number, such as a first offer, that focuses negotiator attention and expectations and helps resolve uncertainty.” Offering a range of choices helps resolve uncertainty, and promote customer ownership of the final outcome. It lets the customer pick the number for the analysis based on his belief of how the cost aligns to other items.

An analyst can only do so much in terms of promoting her completed analysis within an organization. The IT champion is typically the one who has to carry the results up the chain of command and defend them internally. It is therefore particularly important that the customer “owns” the numbers presented in the analysis. An interesting occurrence we see, and that studies tend to validate, is that once a customer accepts ownership of a cost for a solution component, even if it is later shown incorrect, he will often still defend it internally.

## The Data Gathering Process

In an ideal scenario, and certainly in a Comprehensive Value Study, you will receive access to the actual business executives and other key stakeholders who can directly articulate the business objectives that are most important to them. I recommend setting up an agenda for at least a 20-minute interview with each executive stakeholder. The areas I try to flesh out include:

- **Organizational Mission**
- **Business Objectives**
- **Business Pain Points**
- **Business Objectives and Pain Points Potentially Addressed by the Project**

It's also a great opportunity to look for hot buttons or risks that, while perhaps not impacting the numerical results significantly, can make a big impact on the ultimate analysis narrative. Some common areas include:

- **Digital Transformation Initiative**
- **Green Initiatives**
- **Risk of Downtime**
- **Reputation (especially a reputation as innovators)**
- **Competitive Advantage**
- **Faster Time to Market**
- **Customer Satisfaction/Retainment**
- **Net Promoter Score**
- **Employee Satisfaction**
- **Employee Productivity**
- **Increased Agility**

## **IT Staff Interviews**

A similar interview process can then be initiated with appropriate IT leadership/staff. Seek information such as:

- **IT Objectives**
- **IT Pain Points**
- **Status Quo Environment**
- **Solutions Being Considered**
- **Hot Buttons**

## Questionnaire

I recommend walking through a questionnaire with the customer, such as the example shown in *Figure 6-6*, which is one of the pages of the 6-page questionnaire we use for TCO of Nutanix HCI vs. 3-Tier.

High Level Platform Information	
What are the total number of virtual machines (VMs) running in the study environment?	<i>Owner: Server Administrator</i>
How many of the total VMs run on blade servers?	<i>Owner: Server Administrator</i>
How many of the total VMs run on rackmount based servers?	<i>Owner: Server Administrator</i>
What is the expected annual growth percentage for number of VMs?	<i>Owner: Server Administrator</i>
What is the expected annual growth percentage for storage?	<i>Owner: Server Administrator</i>
How much do you pay for data center space? Please specify the unit of measure, e.g. per rack, per sq. ft.	<i>Owner: Data Center Manager</i>
How much do you pay for power? Please specify the unit of measure, e.g. per kWh, per kW.	<i>Owner: Data Center Manager</i>
How many years of support/maintenance do you generally buy with product?	<i>Owner: Finance</i>
What is your standard product depreciation schedule?	<i>Owner: Finance</i>
How many hours of administration are spent per server per day?	<i>Owner: Server Management</i>
How many hours do you spend doing server firmware upgrades per year?	<i>Owner: Server Management</i>
How many hours of administration are spent per storage controller per day?	<i>Owner: Storage Management</i>

**Figure 6-6: TCO Questionnaire Nutanix HCI vs. 3-Tier Legacy**

The questionnaire is just a guideline – every analysis includes considerations not listed as part of a prepared questionnaire. As an example, perhaps the IT staff is considering public cloud for a particular use case. Rather than taking the time to lead the customer through a questionnaire on his projected public cloud costs, you can simply acquire them yourself from the provider’s website, factoring in any discounts as well as additional costs from features such as connectivity, data egress, disaster recovery in a different zone, and so on. Chapter 8 includes a suggested 10-step approach to a public cloud TCO.

### Hard Costs

As part of determining analysis scope, it is important to clarify what variables are relevant for the customer. Most decision-makers are willing to look at tangible costs, also called “hard” costs, which are expenses that can be easily identified and quantified – at least via negotiation.

Some typical hard costs that most decision-makers will consider include:

- **Hardware:** A change in expected hardware costs over the analysis period.
- **Software:** A change in expected software costs over the analysis period.
- **Outsourcing Costs:** A change in expected outsourcing costs – assuming the existing contract will expire during the analysis period or can be renegotiated.
- **Public Cloud Costs:** A change in expected public cloud costs – assuming the existing contract will expire during the analysis period or can be renegotiated.
- **Backup Costs:** A change in cost for backing up data associated with the disruptive infrastructure solution.
- **Disaster Recovery Costs:** A change in cost for deploying, managing, and testing disaster recovery/business continuity associated with the disruptive infrastructure solution.
- **Security Costs:** A change in cost for security associated with the disruptive infrastructure solution.

- **Facilities Costs:** When hosting in a colocation facility, most decision-makers will agree that rack and power costs are “hard.” When hosting internally, however, you may need to determine if these costs should be factored into the analysis, and if so, make the case.

### Administration Costs

IT staff costs typically constitute the largest 3-tier operational expense. The manufacturer of a disruptive solution should be able to point to both empirical studies as well as to other customer examples to provide a fairly good indication of projected IT staff task reductions. Nevertheless, a surprising number of decision-makers resist considering reductions in IT staffing requirements as a valid “hard” savings. They may feel that IT is already understaffed and therefore will not see any real savings from reducing IT staffing tasks if no salaries are eliminated. Of course, this ignores the increased capacity that IT staff will now have to work on other important projects. While you may, in some cases, have no choice other than to proceed with staff savings as a soft cost, it is incumbent to try and change this perception as part of the analysis process. One technique is to show how HCI increases effective staffing resources thereby reducing project portfolio management friction without additional budget.

### Intangibles

Intangibles are costs and benefits that are not easily quantified. They can vary tremendously, including such far-ranging metrics as reduced help desk support, improved IT staff retention, faster application performance, increased employee productivity, scalability, performance, resiliency, or reduced risk. Decision-makers are often less willing to consider these variables, but try and quantify all relevant costs impacting any scenarios evaluated. Negotiation techniques allow you to placemark estimates with an ability to refine them as more information or understanding becomes available.

## Business Outcomes

While a disruptive infrastructure solution should reduce the status quo cost of IT, by far the more important outcome is a change in the way the customer does business. Perhaps the agility will increase sales, reduce customer turnover, or shrink time-to-market. It is precisely the expectation of greater business agility that drives much of the public cloud adoption despite higher costs.

Clarify upfront whether business outcomes should be identified, quantified, and considered as part of the analysis results. While one would think the answer should be an unqualified “yes,” the reality is that many decision-makers are focused almost exclusively on reducing costs. While they might consider business outcomes in the case of a tie, in general they are concerned about hard cost savings.

If the customer is agreeable to considering business outcomes as part of the analysis, then strive to determine what she is trying to accomplish from a business perspective. This is often referred to as the “golden thread” that links the business objectives to the problems or desired outcomes. For example, “Increase digital revenue by 10%,” “Decrease operating expenses by 15%,” “Decrease IT build time for new products by 25%,” etc.

Quantifying these costs and benefits will likely involve both considerable research and negotiation with the customer – but the results can sometimes dwarf traditional infrastructure costs. As mentioned in Chapter 1, we worked with one healthcare organization to track a physician’s time spent on traditional daily tasks. We found that an average physician, when virtualizing her desktop on Citrix XenDesktop on Nutanix, saved 47 minutes per day. This equated to almost two patient visits. When calculated over all of the organization’s physicians over a 5-year period, the total value was measured in hundreds of millions of dollars.

## The Data Gathering Opportunity

The data gathering process helps shape the analysis itself. This is where previously discussed topics, such as scope and IT objectives, take on more definition. It is also an opportunity to interject capabilities of the disruptive solution that the customer might not fully understand or appreciate.

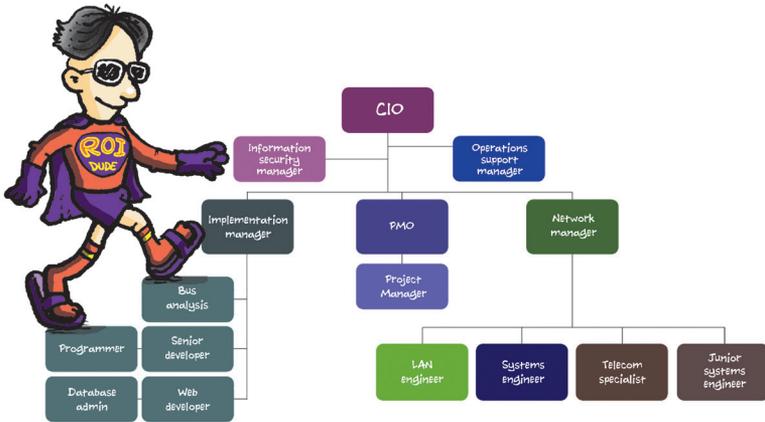
Take, for example, virtualization. The world of legacy virtualization is rapidly changing. Public cloud providers such as AWS, Google Cloud Platform, Alibaba, IBM, and Oracle use a customized version of the open source hypervisor, KVM. And all the leading providers make virtualization invisible to their customers. There is nothing to configure, deploy, manage, and upgrade. On-premises virtualization is changing as well. Gartner no longer even publishes its Magic Quadrant for virtualization.

Nutanix's native hypervisor, AHV, is also a customized version of KVM. And as with public clouds, it comes without cost as part of every Nutanix node, while dramatically simplifying virtualization deployment and management. Even if customers are resistant to deviating from their current virtualization platform, you can recommend modeling a slow migration to show the customer the economic benefits while maintaining their comfort zone.

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# TIP 06

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*When soliciting an internal champion, try and reach as high as you can in the customer IT organization.*

In the next three chapters, we discuss building a compelling ROI story, starting with establishing analyst credibility in Chapter 7. Chapter 8 addresses crunching the numbers, and Chapter 9 provides some guidance and examples for pulling everything together into an analysis report and presentation.

# 07

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## Ethos - The Importance of Establishing Credibility

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*“It is routinely my policy to reject any ROI analysis offered to me by a vendor. Several large manufacturers ruined the efficacy of and legitimacy of those offers in the 1990s and early 2000’s. So, no matter how much I like and trust a vendor engagement team, I keep my own counsel when it comes to ROI analysis or financial information...Colleagues in my CIO groups often say that they have received an ROI analysis from a vendor, however, it’s not worth sharing because it’s so obviously biased.”*

**Wendy Pfeiffer,  
Nutanix CIO - 2018**

Nutanix's CIO, Wendy Pfeiffer, has an illustrious IT history including leading technology teams at companies such as GoPro, Yahoo!, Cisco, and others. She continues to rack up all kinds of awards such as being named one of 2018's Most Powerful Women in Technology,<sup>1</sup> the 2018 Silicon Valley Business Journal 2018 Woman of Influence,<sup>2</sup> and #1 on the EM360 list, Top 10 CIOs of 2018 Who Inspire and Influence Us.<sup>3</sup> Nevertheless, I disagree with her when it comes to sourcing financial analyses.

Wendy, like many IT leaders, is justifiably skeptical of most vendor-provided analyses because of poor construction, lack of transparency, and an overt bias. When combined with a history of previous disappointments from so-called "disruptive technology," they consequently tend to seek alternative analysis sources such as channel partners or research firms - or simply undertake the task internally. While these alternate sources can work fine for evaluating mature technologies, when it comes to disruptive technology, they risk a status quo bias.

### **Status Quo Bias**

A reluctance to change the status quo makes sense when you consider that IT personnel face constant pressure to keep the environment running well, to guard against innumerable security threats, to quickly deploy new applications and technology that help the business, and to minimize costs. Given these demands, it is no wonder that IT tends to be conservative. Once they have an environment running relatively smoothly, IT staffs tend to be justifiably wary of new technology.

The, "If it isn't broke, don't fix it" principle applies even when the environment is only partially broken. It's taken HCI almost 7 years to surpass converged infrastructure in terms of market share. Many IT organizations would rather live with the high costs, inefficiencies, and after-hours working requirements of legacy IT infrastructure than take a perceived risk of breaking everything with a new technology such as HCI.

When I started my VMware consultancy in 2005, the most common objection we would hear was, “You will never put my production server into a virtual machine!” In many cases, the IT staff were intrigued with the concept of virtualization and intuitively understood it would yield a phenomenal ROI, but they refused to put their necks on the line advocating on its behalf to senior IT leadership. It is difficult for an IT organization to effectively, as Wendy said, “keep our own counsel” when the IT staff fails to promote a promising new disruptive solution to leadership.

Even when IT does present a new technology for evaluation, they can unintentionally create bias against it through not thoroughly understanding the solution’s capabilities, a confirmation bias, or overestimating risk.

## Building Ethos

Building ethos or trust starts with establishing analyst credibility. All analysts, whether working for a manufacturer, channel partner, consultant, cloud provider, research firm, outsourcer/SI or the prospective customer, have at least some bias – if for no other reason than they are likely to have a familiarity with only a limited number of solutions. This technical limitation can lead to a failure to grasp the financial nuances of the disruptive solution (as with Moore’s Law and HCI covered in Chapter 4), leading to skewed results.

Business is about relationships, and relationships depend upon trust. A good analyst, regardless of whom he works for, will present a transparent and fair analysis. Winning one project through deceit is not worth the risk both to the project on the table as well as all future projects with the customer and other potential customers that will inevitably hear about it.

## **Establishing Analyst Credibility**

Regardless of your employer, work to establish credibility and build trust. In many, if not most, cases, this will be an important element in giving the customer the confidence to move forward with a disruptive infrastructure solution.

### **Financial Experience**

An internal IT staff member fulfilling the analyst role can establish credibility by demonstrating some experience in providing financial evaluations. This is essential when the analyst is external to the organization. She should provide full disclosure regarding financial background, including experience, education, and any biases associated with the current evaluation.

### **Technical Experience**

A manufacturer of a disruptive infrastructure solution certainly isn't the only one with in-depth knowledge of its financial and operational implications. Certain channel partners, consultants, research firms, and internal IT staff, among others, may be equally as savvy. But whomever conducts the analysis should convey his technical experience and degree of expertise with the solutions evaluated.

### **Well-Constructed Analysis**

A well-constructed ROI or TCO analysis is not a report generated by numbers fed into a calculator tool. A good analysis is a consulting engagement that captures the organization's business and financial objectives, along with pain points associated with its status quo infrastructure. Spell out any shortfalls in the proposed solutions, along with both hard costs and intangibles. Be sure to also include all assumptions made in crunching the numbers in the analysis report.

## **Transparency**

A financial analysis should never be a “black box” that shows results without assumptions and calculations. And the numbers shouldn’t be simply taken from public research reports without both explanation and justification. When our CS Finance team engages with a customer on an analysis, we strive to ensure that the internal champion understands the calculations well enough that he can feel comfortable presenting them to the CFO or Board.

## **Secure Finance Blessing**

Chapter 6 discusses some of the advantages of collaborating with either Corporate Finance or IT Finance when putting together analysis. This collaboration also helps the analyst establish credibility. If a trusted Finance representative tells senior management that the analysis numbers are valid, they are likely to accept them without further questioning.

## **Establishing Confidence in the New Technology**

Disruptive infrastructure inevitably evokes concerns about viability and reliability, among others. As an analyst, you can help mitigate these apprehensions and establish credibility for the disruptive technology with proof of concept pilots, workshops, case studies, reference calls, research reports, Net Promoter Score (NPS) results, and published articles.

## **Proof of Concept**

During my 20 years of evangelizing disruptive technology as a channel partner, I discouraged proof of concept (POC) pilots for disruptive infrastructure prior to engaging in an ROI analysis. This would ensure the customer wasn’t just looking to kick some metaphorical tires. And if something went wrong with the POC, I wanted the business justification to already be in place to entice the customer to not just give up on the new technology.

When I joined Nutanix, I changed my mind. I still, naturally, always advocate establishing the business case via financial analysis.

But, I've seen enough compelling POCs to have confidence that the solution drives strong interest on its own. While our CS Finance team does not engage directly in POCs, we encourage them as part of the analysis process. Extremely effective disruptive solutions inevitably spawn entirely new solution categories. POCs not only help IT staff validate a new solution versus the status quo, but also to compare it with other category players. This brings both greater understanding and legitimacy in gauging the technology impact quantified in the analysis report.

### **Workshops**

Legacy infrastructure does not exist in a vacuum – its purpose is to run applications. As with the POC, a workshop for the IT staff run by experts in business-critical applications such as SQL Server, VDI, Oracle, and SAP can help the IT staff feel far more comfortable about the viability of the new solution. It enables them to see first-hand the less complex best practices for running applications on the new platform.

### **Case Studies**

Published case studies, especially of organizations in the same industry as the customer, are a terrific way of quickly validating a new technology.

### **Reference Calls**

Set up reference calls with other customers, ideally in the same industry, running the new solution. The reference can answer questions regarding performance, simplicity, and reliability of the product. He can also potentially validate some of the financial assumptions presented in the analysis.

### **Research Reports**

Relevant reports produced by research organizations such as Gartner, IDC, and Forrester can help validate the ROI and other claims of a new technology manufacturer. The Gartner Magic Quadrant is perhaps the most scrutinized research report today. The Gartner HCI Magic Quadrant, for example, includes its perspective on the relative positioning, strengths, and weaknesses of the prominent HCI manufacturers.

## Net Promoter Score (NPS) Results

Disruptive infrastructure demands both responsive and superior support. Use the Net Promoter Score to gauge how well a manufacturer does in this regard. NPS measures customer satisfaction ranging from negative 100 to positive 100. In our industry, the average NPS was 21.2<sup>3</sup> in 2018.

## Published Articles and Social Media

Published articles as well as blog posts, tweets, Reddit threads, and so on are good fodder for building trust in a new technology. Include relevant testimonials to solution viability as part of your analysis presentation.

## NetApp's Use of ROI to Enhance Credibility

NetApp was an early disruptor in the storage industry.

Hamut Pascha, who heads up the financial analysis team for Nutanix in EMEA (Europe/Middle East/Africa), previously brought a business value selling approach to NetApp. Here is Hamut's perspective regarding the importance of manufacturers building credibility regarding their financial analyses.

*"In light of the great recession of 2008, customers tried to avoid IT expenditures and prolonged maintenance contracts in order to avoid a tech refresh. Even smaller investments in many cases required approvals from top management. At NetApp, we came up with the idea of creating ROI business cases for customers. We wanted to support IT leaders justifying IT investments even during the recession.*

*"Before I created the business value selling processes for NetApp, I spoke with the IT teams of some of our large EMEA customers about their expectations of ROI business cases from IT vendors. I also spoke with consulting companies, but concluded that their processes wouldn't fit into a quarterly driven IT company. Here is the amalgamated primary pieces of advice from our customers: 'Don't promise to save us millions before the business case has been calculated. If you involve us in many hours of a preparation*

*and afterwards your business case is weak, then you lose credibility. Don't expect us to spend too much time on ROI business cases. The business case must be transparent and realistic!*

*"The other challenge was articulated very clearly by the NetApp sales teams: 'The business case should accelerate the sales cycle. Any delays caused by an ROI analysis would make the process a 'no go.'*

*"In response, I created my own business case approach by considering the advice from both customers and NetApp's field sales teams. One of the most important rules in the process was not to send a customer a finalized business case before it had been reviewed with her in detail. Only when the customer confirmed all results as being both correct and understood was the analyst allowed to send the customer the ROI case.*

*"About a year and a half after starting the 'business value selling' division at NetApp, we hired a consulting company sponsored by the CFO to review what we had accomplished. The consulting company interviewed our EMEA customers on their experience with our ROI business cases, and then presented their report. The feedback was excellent and a real eye-opener for those who were still skeptical. The company began to invest in Business Value Consultants for the U.S. as well.*

*"This approach to financial analysis generates trust. It helps manufacturers do much more than sell their kit, it helps them build a partnership with the customer."*

## **Start with Why**

*"Value is not determined by those who set the price. Value is determined by those who choose to pay it."*

**Simon Sinek**

When beginning an ROI or TCO analysis, or even when just discussing the possibility of an engagement, I start off by probing the customer's business objectives with questions such as, "What will the business look like in five years? What bottlenecks, if any, does IT today pose for the

business achieving its objectives? How does IT need to evolve to best support the business?"

I do this because I am attempting to establish “the why” for the entire initiative. Marketing Guru, Simon Sinek, points out that the “why” is critical for any transformational effort because it brings the power to justify action.

Many IT staff give little thought to the organization’s business. Asking the right questions helps provide a context for the financial engagement scope and for identifying the pain points that really matter to the long-term best interests of the organization. This approach tends to resonate with IT folks and boost analyst credibility, as demonstrated in this email I received from the enterprise architecture lead from a large company in Australia.

*Hi Steve,*

*It was nice to meet you yesterday. I was very encouraged by our discussions and that they weren’t dominated by the details of the technology and more about what the business wants to achieve strategically and how your solution may play a part in that. That approach definitely aligns with my way of thinking.*

**Many Thanks,  
Ben**

## **Enhancing Ethos with a Narrative**

One of the advantages of telling a financial story rather than just crunching numbers is that, by necessity, it precludes a formulaic approach. As you gain increased understanding of the organization’s

objectives, environment, and pain points, you become more vested in ensuring that the technical people working on the project arrive at a solution that is the best fit for the organization – even if it diverges from your solution. This builds a trust that can be a very powerful catalyst in helping organizations free themselves from the clutches of status quo. In my case, it has led to many clients who have followed me to multiple companies as they themselves switched employers.

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## TIP 07

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*Sometimes your internal champions will have concerns that the ROI results look too good to be believed. It is not unethical to dial back your assumptions to be more conservative.*

08

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Logos -  
The Numbers

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Nutanix Director of CS Finance, Tim McCallum, and I have an ongoing light-hearted debate about which is more important – the financial analysis process or the numerical results. While I weigh in on the process side of the argument, the reality is that nothing happens without the numbers. And as much as I advocate the importance of telling a financial story, sometimes, as in the following case with BigCo, the mandate to IT is almost exclusively to reduce cost.

## Case Study: BigCo Environmental Uncertainty

For over eight months, Nutanix financial analyst, Kelly Craig, and I have been involved with an extensive financial analysis (both TCO and ROI scenarios) for a Fortune 250 company I'll call BigCo. BigCo currently outsources its IT to a global systems integrator, but is unhappy with their performance, level of service, and disaster recovery capabilities. Most importantly, BigCo wants to reduce its costs. Kelly and I have worked through a dozen iterations of spreadsheets and reports. The most recent version involved entering all our results into the firm's internal, specialized spreadsheet format.

Part of the challenge Kelly and I have faced is that BigCo does not have a firm handle on its own costs. As we've painstakingly peeled back the layers of its legacy infrastructure onion, the IT staff has come to realize that its actual expenses in most cases exceed what they had previously believed. These financial discrepancies are further exacerbated by outsourcer contracts that penalize the firm if they move workloads away to a different platform, such as Nutanix HCI.

Kelly and I have very limited exposure to senior management – all our day-to-day work is with IT staff managers. They love the technology, and have made it clear that they appreciate the narrative. Unfortunately, I doubt that much of our results have been reviewed at the senior VP

level. And the finance folks at BigCo crunching our inputs have thus far refused to consider potential “soft” benefits such as a billion dollars over five years in increased user productivity. While the ending of this story is yet to be written, I remain confident in our analysis process and optimistic that it will be a happy one.

## Calculations

Formulas should be easy to follow. I recommend naming cells to assist in this regard. The use of “if” and “nested if” statements can also come in handy when dealing with multiple parameters.

### Calculating Growth

*“It is very difficult to predict – especially the future.”*

**Danish physicist, Neils Bohr**

Chapter 6 discussed the importance of factoring growth into a financial analysis incorporating HCI. We typically quantify growth as a projected percentage increase in the number of VMs and in the annual percentage growth in terabytes of storage. I recommend suggesting something like, “Would it make sense to project a 15% annual increase in VMs?”

### HCI

A good HCI solution can scale out the environment one node at a time, if desired, with no theoretical limits on the number of nodes in a cluster. But because technology continues to rapidly improve over time, the financial model should incorporate an increasing density of VMs per node. Software upgrades further improve density ratios over time.

*Figure 8-1* assumes an annual increase in density of VMs per node of 20% per year. Nodes purchased in year 5 will support over twice the number of VMs as in year 1, thereby slashing the capital expense for the project along with the associated rack space, power, and cooling. And HCI eliminates the risk of facing an unexpected forklift upgrade due to capacity limitations.

VMs Per Node	
Year 1	20
Year 2	24
Year 3	29
Year 4	35
Year 5	42

**Figure 8-1: Example Showing VMs Per Node Assuming 20% Annual Increase in Density**

To see how increasing densities can impact a financial analysis, let's assume that a firm adds 1,000 new desktop (DT) VMs per year, but will realize an average annual 25% increase in VM density per node as shown in *Figure 8-2*. This means that in the fifth year of a project expansion scenario the customer only needs to purchase 37% of the nodes to run the same use case as it would have in year one. In this way capital expense for the project is reduced, along with the associated costs for rack space, power, and cooling. Importantly, it also eliminates 100% of the risk of a forklift upgrade.

	# of New DT VMs Per Year	# Of New Nodes Per Year
Year 1	1000	8
Year 2	1000	6
Year 3	1000	5
Year 4	1000	4
Year 5	1000	3

**Figure 8-2: Reduced HCI Nodes Required with Annual 25% Increase in VM/Node Density**

Figure 8-3 shows an algorithm for calculating the quantity of hyperconverged nodes required over the analysis period based upon projected expansion rates in virtual machines and upon projected increase in density of virtual machines per node where:

$$\# \text{ OF NODES} = \text{RoundUp} \left[ \frac{V_o}{N_o} \right] + \sum_{i=1}^Y \text{RoundUp} \left[ \frac{V_n - V_s}{N_o [1+D]^i} \right]$$

$V_o$  = Initial Number of VMs Needed

$V_n$  = VMs Needed

$V_s$  = VMs Supported

$N_o$  = VMs/Node

$D$  = Annual Percentage Increase in VMs/Node Density

$Y$  = Total Number of Years

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**Figure 8-3: Calculating the Number of HCI Nodes Needed Over Time**

## Calculating Facilities Costs

Facilities costs, such as rack space and power, tend to always be considered hard costs if a colocation facility is used, and either hard or soft if hosted at an organization's own datacenter. A change in internal datacenter costs over the analysis period – if freed up rack space or reduced power costs will reflect in the P&L of the decision-maker – makes for a compelling case of considering them as hard costs.

### Rack Space

When hosting at a colocation facility, the customer typically can obtain monthly costs for rack space, which can be divided by the number of U (Units) the rack contains. It can then be multiplied by the number of U the equipment consumes. Empty rack space required for air flow purposes should be added to the equipment space requirements.

If hosting internally, an estimated cost per rack can often be negotiated based either upon the total square footage of the datacenter or upon other variables such as the rack space cost at colocation facilities.

## **Power**

A colocation facility will typically either combine the power cost as part of the monthly rack price, or charge for it separately – often based upon the number of circuits utilized.

If hosting internally, the average watts/hr. required for the various server and storage components can be calculated in various ways.

### **For example:**

1. Use the manufacturer specification sheets to obtain typical or operating power usage or, if not represented, a rule of thumb is 70% of total power. While actual usage can vary depending upon load, the specification sheet serves as a reasonable basis for a good estimate.
2. Various tools, and potentially UPS monitoring, can measure equipment power consumption from the deployed source.

Remember to include cooling and other overhead costs as part of power. Power Utilization Efficiency, or PUE, is generally accepted as a factor for cooling power overhead. PUE is the ratio of power intake to actual power consumption of the equipment. For example, a PUE of 1.7 would indicate roughly 70% of the power cost goes to cooling. When the PUE is unknown, we typically use a ratio of 1.7.

## **Calculating Administrative Costs**

Our team typically follows one of three approaches to calculating administrative costs:

1. We estimate the percentage of FTE (full time equivalents) server/storage/network administrators required for each solution multiplied by the average fully burdened applicable administrator salary.

2. We estimate hourly time requirements for the various administrative tasks and multiply those by average fully burdened applicable administrator hourly wages.
3. We actually monitor administrative hourly time required for repetitive tasks for each solution and multiply that by the average fully burdened applicable administrator hourly wages.

### ***Administration Negotiation Example***

The first TCO analysis I prepared for a prospective Nutanix customer was in 2014 for Bob Orkis, CIO of a fast-growing financial company. He had reached capacity on his first Vblock (converged infrastructure) after just a year, and was getting ready to purchase a second unit. The TCO compared the projected cost of that second Vblock vs. Nutanix. At the time, we had a few folks who had come over from VCE (manufacturer of Vblock) enabling me to make a very detailed list comparing the administrative requirements of Vblock vs. Nutanix as shown in *Figure 8-4*. The analysis projected 157 hours each month to manage the Vblock vs. 32 to manage Nutanix. The projected yearly savings came to 1,500 hours – about three-fourths of an FTE. Bob felt that figure was a little too high, and so we “negotiated” a savings of half of an FTE. The analysis was still very compelling, and Bob ended up moving all of his workloads over the next few years to Nutanix.

LOGOS - THE NUMBERS

Administration Costs - Monthly	Hours Vblock	Dollars Vblock	Hours Nutanix	Dollars Nutanix	Dollars Savings
<b>Storage Administration</b>					
Fabric Administration	0.50	\$49.66	0.00	\$0.00	\$50
Storage Monitoring	6.00	\$595.87	2.00	\$132.42	\$463
Storage Allocation	52.44	\$5,207.89	2.00	\$132.42	\$5,075
Aggregate/ Volume Management	52.44	\$5,207.89	0.00	\$0.00	\$5,208
Snapshot Management	8.67	\$861.03	0.00	\$0.00	\$861
Reporting	8.67	\$861.03	8.67	\$574.02	\$287
Upgrade (amortized over 1 year)	6.67	\$662.41	0.33	\$21.85	\$641
Storage Migration	8.01	\$795.48	0.00	\$0.00	\$795
<b>Subtotal</b>	<b>143.4</b>	<b>\$14,241.26</b>	<b>13.0</b>	<b>\$860.70</b>	<b>\$13,381</b>
<b>Network Administration</b>					
Log Management	0.33	\$32.77	0.00	\$0.00	\$33
Configuration Administration	0.33	\$32.77	0.00	\$0.00	\$33
Fabric Administration	0.33	\$32.77	0.00	\$0.00	\$33
<b>Subtotal</b>	<b>0.99</b>	<b>\$98.32</b>	<b>0.00</b>	<b>\$0.00</b>	<b>\$98</b>
<b>Server Administration</b>					
Service Template Administration (UCS = 1 hr. per blade)	6	397	0	0	\$397
Service Profile Administration (UCS = .5 hr. per blade)	3	199	0	0	\$199
ESX Server Administration (1 hr. per UCS blade / Nutanix node)	6	397	6	397	\$0
Standard Server Administration (ServerAdminRatio X WorkYear X Blades / Nodes / 12)	13	834	13	834	\$0
<b>Subtotal</b>	<b>13</b>	<b>1,827</b>	<b>19</b>	<b>1,231</b>	<b>\$596</b>
<b>Total Admin</b>	<b>157</b>	<b>16,166</b>	<b>32</b>	<b>2,091</b>	<b>14,075</b>

	Base Salary	Fringe Load	Burdened Salary	Cost Per Hour
Storage Administrator	\$150,000	\$37,500	\$187,500	\$99.31
Server Administrator	\$100,000	\$25,000	\$125,000	\$66.21

Figure 8-4: Financial Company Admin Task Time & Salaries

## Calculating Risk

Calculating risk will vary greatly depending upon the organization, the specific risk, and the aptitude for including what is often perceived as a “soft” cost. Downtime, however, is a specific risk that often is possible to quantify. We have, for example, seen large organizations choose the Nutanix enterprise cloud scenario specifically to reduce downtime. One large organization had been averaging three outages per month on its existing platform. Each outage cost the company approximately \$900,000 which the decision-makers accepted as a TCO comparison cost.

Tim McCallum, wrote a 2016 LinkedIn post titled, [Nutanix Reduces Risk Valuation Costs.](#)<sup>1</sup> Tim offers good suggestions on quantifying downtime. In one example, he calculates that a 98% reduction in downtime (common with Nutanix HCI) can save an average organization \$1.8 million over 5 years based upon cumulative risk and an Emerson Network Power analysis.

## TCO/ROI Tools

The CS Finance team uses a wide variety of spreadsheet-based tools depending upon the use case, offering, and competition. For example, we have a spreadsheet for TCOs comparing Nutanix Enterprise Cloud vs. Public Cloud. Another spreadsheet compares Nutanix to 3-tier, while still another compares Nutanix to competing HCI offerings. We alternatively use an ROI analysis tool to calculate projected savings from virtualizing physical servers or desktops on Nutanix (a simplified customer-facing version of this VDI tool is on the Nutanix web site <https://www.nutanix.com/calculator/vdiroi/>). We utilize other tools for specific use cases, such as SAP or Splunk, while still other tools are geared toward the ever-increasing number of new Nutanix offerings including AHV, Prism Pro, Calm, Era, Beam, Xi, Frame, Files, and Flow.

## Case Study: San Mateo County ROI

Figure 8-5 shows the 5-year cash flow summary report for the ROI analysis I did in mid-2014 for virtualizing San Mateo County's 300 physical servers. As you can see, the results are laid out on a cash flow basis year by year, which is typically the way Finance folks like to see them. I presented the results both with and without staff costs to show IT leadership the specific projected staff savings. Either way, the 5-year ROI looked great at 1,597% with staff costs, or 1,249% without. The payback period on the investment was 3.5 months and 4.1 months respectively.

### Return on Investment Analysis (ROI)

Year	Physical Costs	Virtual Costs	Net Cash Flow	Without Staff Costs
Investment	-	\$725,000	(\$725,000)	(\$725,000)
Year 1	\$2,537,600	\$39,671	\$2,497,929	\$2,137,929
Year 2	\$2,834,400	\$1,151,731	\$1,682,669	\$1,142,669
Year 3	\$2,951,200	\$130,175	\$2,821,025	\$2,281,025
Year 4	\$3,068,000	\$444,490	\$2,623,010	\$2,083,010
Year 5	\$3,184,800	\$505,805	\$2,678,995	\$2,138,995
<b>Total</b>	<b>\$14,576,000</b>	<b>\$2,997,373</b>	<b>\$11,578,627</b>	<b>\$9,058,627</b>
<b>ROI</b>			<b>1597%</b>	<b>1249%</b>
<b>Payback</b>	-	-	<b>3.5 Months</b>	<b>4.1 Months</b>
<b>IRR</b>			<b>326%</b>	<b>268%</b>

Figure 8-5: ROI Analysis Results for San Mateo County

*“We estimate that by the end of this year we will have already saved over \$6 million by moving to the Nutanix hyperconverged configuration, rather than purchasing and deploying all of the traditional server, storage, compute environment we would have required.”*

Jon Walton, CIO [San Mateo County 05/16/2016](#).<sup>2</sup>

## **Nutanix HCI Vs. 3-Tier**

When creating a spreadsheet tool, I recommend using toggle buttons to quickly evaluate different what/if scenarios. For example, our spreadsheet for comparing AHV vs. 3-tier includes a toggle button showing the savings impact from increased VM density due to improving technology. Another toggle button shows the impact for migrating to Nutanix AHV virtualization.

I recommend using separate tabs for segmenting variables such as Inputs, Detailed Scenario Costs, Asset Procurement, and Reports to help track the many analysis components and calculations. This approach also makes it easier for the customer to follow the logic. Following is an example of our TCO tool comparing Nutanix HCI vs. 3-tier legacy, which includes 21 tabs. *Figure 8-6* shows a look at the “Report Menu” tab, which summarizes the various views the tool enables.

Report Category	Report Name	Description
Financial Views	Financial Summary	The Financial Summary provides TCO both by category and graphically. It is often used as a single page TCO within proposals.
	3-Tier High-Level Pro Forma	Pro Forma for 3-tier providing detailed investment and category modeled spending by year.
	Nutanix High-Level Pro Forma	Pro Forma for Nutanix providing detailed investment and category modeled spending by year.
	Cash Flow	Cash Flow categorized spending is commonly desired by Finance organizations. This table shows the changes in balance sheet due to spending and use of assets.
	Year Over Year Investment	This table shows the total cost based on investment.
	OpEx & Run Rate	Chart and table showing annual OpEx spending and average run rate. These provide finance with understanding of how efficiently they are using assets.
	Annual Business Benefits Output	Charts showing the annual benefits to the business graphically
	Benefits Charts & Deployment Schedule	Detail charts showing benefits over time with schedule to update deployment assumptions
	Year Over Year TCO Comparison	Chart illustrating year over year total cost of ownership.
Asset Views	Asset Procurement	Table projecting need for year over year assets.
	Data Center Utilization	Chart illustrating year over year use of rack units in the datacenter.
Advanced Model Detail	Detail 3-Tier Model	Model details for editing/customizing model (advanced only)
	Detail Nutanix Model	Model details for editing/customizing model (advanced only)

**Figure 8-6: Nutanix HCI TCO Tool vs. 3-Tier Legacy - Reports Menu**

Figure 8-7 provides a partial look at the “Simple View” tab. The “Simple View” tab provides a summary TCO comparison of the two solutions along with assumptions:

- Number of VMs and projected yearly growth
- Current storage per VM and projected growth
- Number and type of servers
- VM per server/HCI node density, cost of compute, storage and storage network
- Rack units used for each solution
- Hypervisor used and cost

## TCO Analysis - 3-Tier vs. Nutanix

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Business Problem/Goals	-		
Business Problem Impact to Business	-		
Initial Number of Virtual Machines on Blades	400	VM Year over Year Growth	25%
Initial Number of Virtual Machines on Rackmount	400		
Usable Storage (GB) per VM Average	400	Data Year over Year Growth	25%
		VM per Server/Blade/Node	61

### Compute

Solution Type	Hybrid
Cost per Chassis	\$55,000
Cost per Blade Server	\$18,500
Cost per Rackmount Server	\$22,857
Rack units per Chassis	10
Rack units per Rackmount Server	2
KwH per Chassis	0.55
KwH per Server Blade	0.208
KwH per Rackmount Server	0.56

### Storage

Cost of Storage Controller	\$246,000
Cost of Additional Disk Enclosure	\$45,000
Usable GB per Storage Controller	0
Usable GB per Disk Enclosure	12600
Rack units per Storage Controller	4
Rack units per Disk Enclosure	2
KwH per Storage Controller	0.97
KwH per Disk Enclosure	0.971

### Storage Network/Ethernet

Cost per SAN Switch	\$25,000
Number of ports per switch	48
Cost per Fabric Interconnect	\$25,000
Number of Ports per Fabric Interconnect	12
Rack units per Switch	1
Rack units per Fabric Interconnect	1
KwH per Switch	0.057
KwH per Fabric Interconnect	0.057

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**Figure 8-7: Nutanix HCI TCO Tool vs. 3-Tier Legacy - Simple View**

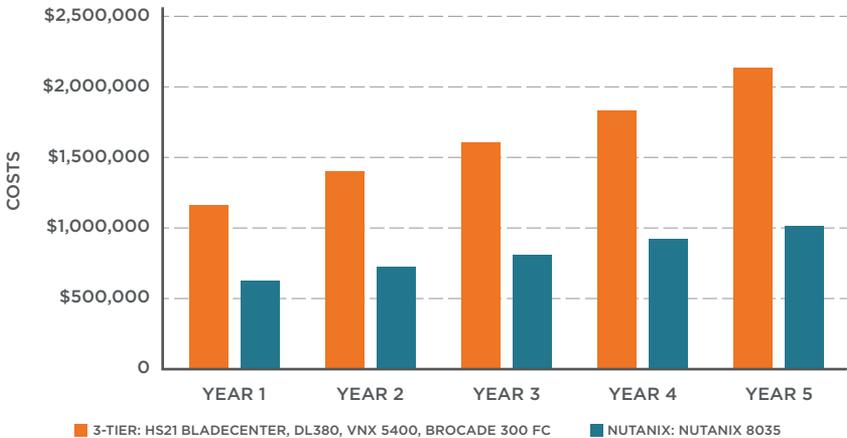
Figure 8-8 shows the “Cash Flow” tab. The chart in this tab presents a 5-year overview of projected costs for each solution broken down by expense, and categorized as either Capital Expense or Operating Expense.

	3-Tier Legacy	Nutanix	Delta Legacy vs. Nutanix
<b>Capital Expense</b>			
Compute Layer (Blades, Rackmount Servers) vs. Nutanix	\$675,355	\$4,350,000	-\$3,674,645
Data Storage Services	\$6,015,000	\$0	\$6,015,000
Storage Area Network & Ethernet Switches	\$100,000	\$100,000	\$0
Fabric Interconnects	\$50,000	\$0	\$50,000
SAN Ports & Cables	\$10,800	\$4,350	\$6,450
Server Virtualization Software/Hypervisor	\$222,000	\$0	\$222,000
Capitalized Professional Services/Installation	\$252,750	\$25,375	\$227,375
<b>Total Capital Expense</b>	<b>\$7,325,905</b>	<b>\$4,479,725</b>	<b>\$2,846,180</b>
<b>Operating Expense</b>			
Data Center Rack Space	\$247,429	\$21,714	\$225,714
Power & Cooling	\$509,281	\$48,284	\$460,997
Post Warranty Support	\$0	\$10,000	-\$10,000
Server Virtualization Software Support	\$173,040	\$0	\$173,040
Administration FTE	\$2,104,167	\$541,667	\$1,562,500
<b>Operating Expense</b>	<b>\$3,033,916</b>	<b>\$621,665</b>	<b>\$2,412,251</b>
<b>Total CapEx &amp; OpEx</b>	<b>\$10,359,821</b>	<b>\$5,101,390</b>	<b>\$5,258,431</b>

**Figure 8-8: Nutanix HCI TCO Tool vs. 3-Tier Legacy - Cash Flow**

Figure 8-9 shows the OpEx tab. This tab indicates the projected average run rate per month and per quarter for both hardware/software and operating expenses for both the 3-tier and Nutanix scenarios. The chart also compares the annual cost graphically by year between both scenarios.

## Annual OpEx

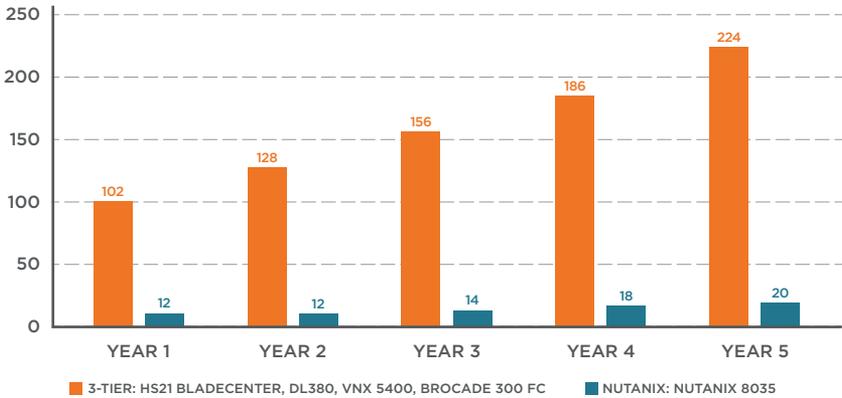


	Option 1: 3-Tier		Option 2: Nutanix	
	Month	Quarter	Month	Quarter
<b>Average Run Rate</b>				
<b>Hardware &amp; Software</b>				
Depreciation Expense	\$79,962	\$239,886	\$58,724	\$176,173
Software Amortization	\$5,768	\$17,304	\$0	\$0
Professional Service Amortization	\$2,947	\$8,840	\$335	\$1,006
<b>Operating Costs</b>				
Data Center Expense	\$4,124	\$12,371	\$362	\$1,086
Power & Cooling Expense	\$8,488	\$25,464	\$805	\$2,414
Maintenance Amortization	\$0	\$0	\$167	\$500
Administration FTE Expense	\$35,069	\$105,208	\$9,028	\$27,083
<b>Total Average Run Rate</b>	<b>\$136,358</b>	<b>\$409,074</b>	<b>\$69,421</b>	<b>\$208,262</b>

**Figure 8-9: Nutanix HCI TCO Tool vs. 3-Tier Legacy - OpEx**

Figure 8-10 shows the Datacenter tab. This tab graphically shows the projected rack unit consumption by year for each scenario.

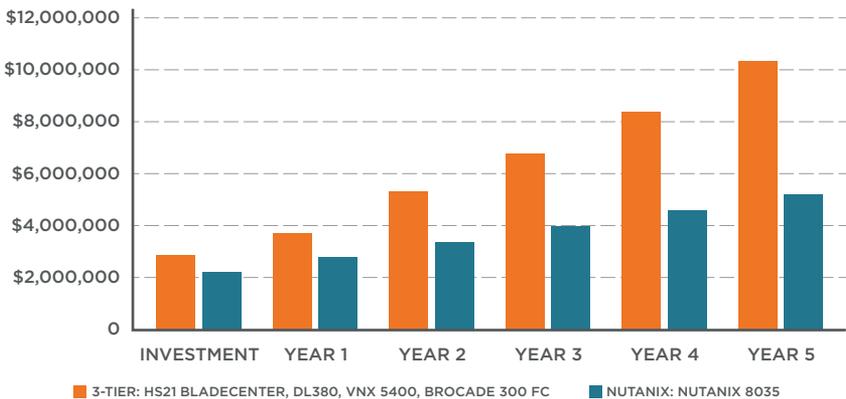
## Rack Unit Consumption



**Figure 8-10: Nutanix HCI TCO Tool vs. 3-Tier Legacy - Datacenter**

Figure 8-11 shows the Investment Comparison tab. This tab graphically shows the projected investment required for each scenario by year.

## TCO Comparison



**Figure 8-11: Nutanix HCI TCO Tool vs. 3-Tier Legacy - Asset Procurement**

## TCO Financial Summary

	<b>Option 1: 3-Tier</b>	<b>Option 2: Nutanix</b>
<b>Capital Costs</b>		
Compute Layer	\$675,355	\$4,350,000
Data Storage Services	\$6,015,000	\$0
Storage Area Network & Ethernet Switches	\$100,000	\$100,000
Fabric Interconnects	\$50,000	\$0
SAN/Ethernet Ports & Cables	\$10,800	\$4,350
Server Virtualization Software/Hypervisor	\$222,000	\$0
Capitalized Professional Services/Installation	\$252,750	\$25,375
<b>Sub-Total Capital Costs</b>	<b>\$7,325,905</b>	<b>\$4,479,725</b>
<b>Operating Costs</b>		
Data Center Rack Space	\$247,429	\$21,714
Power & Cooling	\$509,281	\$48,284
Post Warranty Support	\$0	\$10,000
Server Virtualization Software Support	\$173,040	\$0
Administration FTE	\$2,104,167	\$541,667
<b>Sub-Total Operating Costs</b>	<b>\$3,033,916</b>	<b>\$621,665</b>
<b>Opportunity Costs (Business Improvements)</b>		
Improved Application Time To Market	\$97,875	\$0
Improved Customer Retention	\$334,917	\$0
Reduced Cost of Downtime	\$901,220	\$0
Reduced IT Integration Costs	\$30,432	\$0
Improved General System User Productivity	\$254,998	\$0
Improved Information Security Admin Productivity	\$4,403	\$0
<b>Sub-Total Opportunity Costs</b>	<b>\$1,623,845</b>	<b>\$0.00</b>
<b>Total Cost of Ownership</b>	<b>\$11,983,666</b>	<b>\$5,101,390</b>

**3-Tier**  
**\$11,983,666**

**Nutanix**  
**\$5,101,390**

■ CAPITAL COSTS  
 ▨ OPERATING COSTS  
 ▩ OPPORTUNITY COSTS

Figure 8-12: Nutanix HCI TCO Tool vs. 3-Tier Legacy - Financial Summary

Figure 8-12 shows the Financial Summary tab. This tab includes a 5-year snapshot of each cost broken down between Capital Costs and Operating costs, as well as the estimated opportunity cost of foregone business improvements from staying with 3-tier infrastructure.

## Quantifying Revenue and Cost Benefits

Figure 8-13 switches gears and shows the Benefit Model tab, which quantifies revenue and cost benefits.

### Benefit Summary

Number	Revenue Benefits	Value (USD)	Key Enablers
1	Improved Application Time to Market	\$83,589	Single Enterprise OS
2	Improved Customer Retention	\$286,031	Excellence in Customer Support and Satisfaction
<b>A</b>	<b>Total Revenue Benefits</b>	<b>\$369,620</b>	
Number	Cost Benefits	Value (USD)	Key Enablers
1	Reduced Cost of Downtime	\$346,354	Web-scale Engineering
2	Reduced IT Integration Costs	\$11,696	HTML5 Single Pane of Glass
3	Improved General System User Productivity	\$98,000	Web-scale Engineering
4	Reduced IT Infrastructure Acquisition Costs	\$153,991	Flexible Consumption Model
5	Improved Information Security Admin Productivity	\$1,692	Built-in Security
<b>B</b>	<b>Total Cost Benefits</b>	<b>\$611,733</b>	

### Figure 8-13: Nutanix HCI TCO Tool vs. 3-Tier Legacy - Benefit Model

Figure 8-14 shows the calculations for Improved Application Time to Market as part of Revenue Benefits. Revenue Benefits also includes Improved Customer Retention, while Cost Benefits includes Reduced Cost

of Downtime, Reduced IT Integration Costs, Improved General System User Productivity, and Improved Information Security Admin Productivity.

Improved Application Time To Market	Value (USD)	Source/ Comments/ Assumptions
<b>A</b>	Total Revenue	\$169,500,000
<b>B</b>	Estimated % of annual revenue opportunity from new applications enablement	Sample input
<b>C</b>	Estimated annual revenue opportunity from new applications roll out	1.0%
<b>D</b>	Per day revenue opportunity from new applications roll out	Calculation: [A] x [B]
<b>E</b>	Time-to-Market new applications (Days)	\$1,695,000
<b>F</b>	Potential % reduction in time-to-market for new applications	Calculation: [C] / [365 days]
<b>G</b>	Potential reduction in time-to-market new applications	According to the BMC Software Thought Leadership Whitepaper.
<b>H</b>	<b>Estimated increase in annual revenue due to improved application time-to-market</b>	Key Enabler: Single Enterprise OS. Software solution allowing for support of a variety of platforms.
<b>A</b>	Total Revenue	18
<b>B</b>	Estimated % of annual revenue opportunity from new applications enablement	Calculation: [E] x [F]
<b>C</b>	Estimated annual revenue opportunity from new applications roll out	Calculation: [D] x [G]
<b>D</b>	Per day revenue opportunity from new applications roll out	\$4,644
<b>E</b>	Time-to-Market new applications (Days)	180
<b>F</b>	Potential % reduction in time-to-market for new applications	10.0%
<b>G</b>	Potential reduction in time-to-market new applications	18
<b>H</b>	<b>Estimated increase in annual revenue due to improved application time-to-market</b>	<b>\$83,589</b>

**Figure 8-14: Benefit Model Tab - Improved Application Time to Market**

## Case Study: HCI vs. 3-Tier for Large Healthcare Organization

Figure 8-15 shows the 5-year cash flow summary TCO for a large health care facility. As with the ROI analysis, results are shown on a cash flow basis year by year. In this case, the projected HCI costs are 35.7% less than under the legacy 3-tier environment.

### TCO Comparison

Year	3-Tier Legacy	Nutanix	Delta Legacy vs. Nutanix
Investment	\$8,411,872	\$4,291,200	\$4,120,672
Year 1	\$2,544,874	\$1,825,609	\$719,265
Year 2	\$5,029,037	\$3,152,406	\$1,876,631
Year 3	\$3,121,852	\$3,252,686	(\$130,833)
Year 4	\$4,323,827	\$3,412,423	\$911,404
Year 5	\$6,958,244	\$3,599,017	\$3,359,228
<b>Total</b>	<b>\$30,389,707</b>	<b>\$19,533,341</b>	<b>\$10,856,366</b>

### Figure 8-15: TCO Summarizing Cash Flows for Healthcare Org

Figure 8-16 shows the same projected \$10,856,366 in 5-year cash flow savings broken down by category. The projected Capital Expenses savings are \$6,154,794 - 56% of the total. In addition to the almost \$11 million in infrastructure savings, we projected another \$7.6 million in increased revenues over 5 years as a result of the more agile HCI infrastructure.

## TCO Financial Summary

	<b>Option 1: 3-Tier</b>	<b>Option 2: Nutanix</b>
<b>Capital Costs</b>		
Compute Layer	\$1,740,000	\$6,240,000
Data Storage Services	\$9,346,920	\$0
Storage Area Network Total Services	\$343,392	\$0
SAN Ports & Cables	\$40,768	\$0
Server Virtualization Software/Hypervisor	\$1,792,000	\$1,064,000
Capitalized Professional Services/Installation	\$676,516	\$96,000
<b>Sub-Total Capital Costs</b>	<b>\$13,939,595</b>	<b>\$7,400,000</b>
<b>Operating Costs</b>		
Data Center Rack Space	\$923,524	\$86,857
Power & Cooling	\$821,262	\$173,665
Post Warranty Support	\$4,095,066	\$6,249,579
Server Virtualization Software Support	\$1,397,760	\$618,240
Administration FTE	\$9,212,500	\$5,005,000
<b>Sub-Total Operating Costs</b>	<b>\$16,450,111</b>	<b>\$12,133,341</b>
<b>Opportunity Costs</b>		
Downtime Risk Valuation	\$833,643	\$12,505
Limiting Business Expansion due to Lack of Storage	\$7,572,215	\$0
Inability to Automate VM Orchastration	\$375,000	\$0
<b>Sub-Total Opportunity Costs</b>	<b>\$8,780,858</b>	<b>\$12,505</b>
<b>Total Cost of Ownership</b>	<b>\$39,170,565</b>	<b>\$19,545,846</b>
<b>Return on Investment</b>		<b>457%</b>

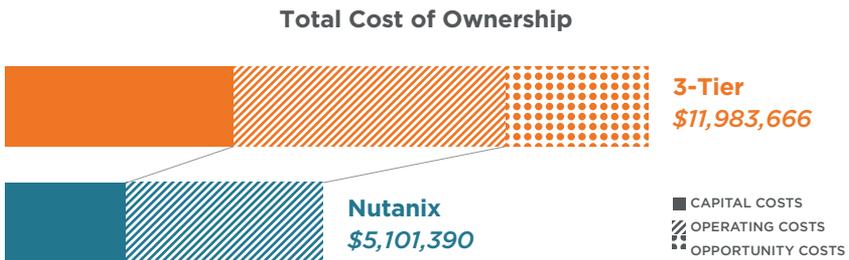


Figure 8-16: TCO by Category for Health Care Organization

## Comparing HCI vs. HCI

*“Unlike humans who can work around weakness in good-enough business software, applications cannot work around good-enough infrastructure software they run on. ‘Good-enough infrastructure’ is an oxymoron.”*

Dheeraj Pandey  
CEO, Nutanix. [CRN](#)<sup>3</sup> 2018



We’ve shown examples of comparing Nutanix HCI vs. legacy infrastructure and with public cloud. But how do you compare a disruptive technology between two or more manufacturers who provide competing solutions?

This type of comparison typically requires even more diligence to understand the architecture, capabilities, and financial nuances of each solution. A Dodge Caliber, for example, may enable someone to drive to a location as quickly as a Tesla Model S, but the two vehicles are hardly equivalent. While Nutanix pioneered the web-scale version of HCI, there are now around [40 hyperconverged players](#).<sup>4</sup> In a virtualized environment, an organization can lose a server – and it’s no problem at all. If a SAN fails, it’s painful, but most larger enterprises have multiple SANs – so they can hobble by. If an HCI environment fails, however, the organization is out of business. It is imperative to evaluate competing HCI solutions not just on straight TCO, but also on resiliency, simplicity, performance, support, vision, and an ability to enable business objectives.

Figure 8-17 shows an analysis we did that is representative of one of hundreds of application environments run by a large organization. Note that while the Nutanix CapEx and OpEx is about 40% lower than the competitive solution, it is the downtime that really makes the difference. This organization had originally rolled out the competitive product, and they knew down to the minute the amount of downtime and the associated cost the other HCI solution entailed.

	Competitive HCI	Nutanix	Delta
<b>Capital Expense</b>			
Compute Layer (Blades, Rackmount Servers) vs. Nutanix	\$296,160	\$355,804	-\$59,644
Storage Area Network & Ethernet Switches	\$14,223	\$14,223	\$0
SAN Ports & Cables	\$2,221	\$1,111	\$1,111
CALM Software	\$0	\$12,834	-\$12,834
HCI Licensing	\$31,896	\$0	\$31,896
VRealize Suite Advanced	\$7,073	\$0	\$7,073
Server Virtualization Software/ Hypervisor	\$27,148	\$0	\$27,148
Capitalized Professional Services/ Installation	\$29,616	\$4,813	\$24,803
<b>Total Capital Expense</b>	<b>\$408,338</b>	<b>\$388,784</b>	<b>\$19,554</b>
<b>Operating Expense</b>			
DC Server Room Rack Space	\$27,501	\$9,872	\$17,629
Power & Cooling	\$30,523	\$11,588	\$18,935
Post Warranty Support	\$105,877	\$3,129	\$102,748
HCI, VRealize, Server Virtualization Software Support	\$79,035	\$0	\$79,035
Administration FTE	\$48,589	\$6,517	\$42,072
<b>Operating Expense</b>	<b>\$291,524</b>	<b>\$31,106</b>	<b>\$260,418</b>
<b>Opportunity Cost</b>			
Business Loss Due to Outages	\$1,307,115	\$39,213	\$1,267,901
<b>Total Opportunity Cost</b>	<b>\$1,307,115</b>	<b>\$39,213</b>	<b>\$1,267,901</b>
<b>Total CapEx &amp; OpEx</b>	<b>\$2,006,977</b>	<b>\$459,103</b>	<b>\$1,547,873</b>

**Figure 8-17: HCI vs. HCI for an Application Environment**

## Comparing HCI vs. Public Cloud

While it is difficult to not think of public cloud as “competition” to an on-premises HCI solution, the reality, as discussed repeatedly in this book, is that most organizations will have a multi-cloud environment. A financial analysis should reflect an optimal economic strategy for deploying specific workloads that encompasses both on-premises HCI and, likely, multiple public infrastructure and SaaS clouds.

When generating a TCO analysis comparing public cloud versus HCI, it is important – as always – to incorporate all the costs affecting both scenarios. For example, HCI should include facilities and power costs, while public cloud should include connectivity expense. Calculating administrative costs for each scenario can be tricky – especially for public cloud. Chapter 3, for example, talks about the frequent overlap of administrative costs during the long transition period to public cloud. As a rule of thumb, we call the administrative costs a wash between on-premises HCI and public cloud (on-premises 3-tier administrative costs are usually much higher).

Following is an abbreviated version of the 10-step process we follow when engaged in a TCO analysis assessing public cloud monthly base costs. The calculated monthly base costs can be extrapolated out to quarters and years. As with all of our analyses, we generally advocate a 5-year analysis period. TCO studies using time-frames less than the depreciation cycle risk overstating on-premises costs by failing to include remaining depreciation or book value of IT assets.

**Step 1:** Run an application such as Nutanix Collector or RVTools in the current on-premises environment to understand oversubscription of vCPU to physical core (pCPU), allocated memory, and storage at the VM level. This step helps determine a usable baseline for mapping. The output allows for a reasonable understanding of the initial constraints of the environment.

**Step 2:** Compare vCPU to pCPU ratios by cluster by dividing the vCPU by physical cores. These ratios help IT understand when there is opportunity to consolidate cloud compute resources or when additional resources may be needed.

**Step 3:** Determine any oversubscription of memory within the current environment. Before mapping between VMs onto both cloud and on-premises instances, it may be important to right-size the VM instances. Also identify whether consolidation or reduction of vCPU or memory can determine the appropriate cloud instance to be mapped to the VM. Keep in mind that many applications may require a minimum amount of vCPUs and cannot be reduced regardless of the oversubscription. Memory per GB allocation is typically measured as a 1:1 between VMs and cloud instances. However, there can be oversubscription or overallocation that may justify right-sizing prior to mapping.

**Step 4:** Once, the environment is right-sized to show individual VMs and their corresponding vCPU and memory target allocations, apply the rule of constraints to map the VMs to target cloud instances. The VM can be mapped to the lowest potential cloud instance that meets the minimum of both the vCPU and memory target. Note that this may result in a slight overallocation of one of these two constraints. *Figure 8-18* shows the mapping of a few instances to AWS, while *Figure 8-19* does the same with Azure.

Name	vCPU	vRAM (GB)	Constraint	Instance Mapping	vCPU	RAM (GiB)
VM 1	1	1.024	RAM	t2.small	1	2
VM 2	2	4.096	RAM	t2.large	2	8
VM 3	3	2.048	RAM	c4.xlarge	4	7.5
VM 4	4	20.48	RAM	m4.2xlarge	8	32

**Figure 8-18 AWS Instance Mapping**

Name	vCPU	vRAM (GB)	Constraint	Instance Mapping	vCPU/ Core	RAM (GiB)
VM 1	1	1.024	RAM	B1S	1 Core	1
VM 2	2	4.096	RAM	A2 v2	2 Core	4
VM 3	4	2.048	vCPU	A4 v2	4 Core	8
VM 4	8	20.48	RAM	D8 v3	8 vCPU	32

**Figure 8-19 Azure Instance Mapping**

**Step 5:** Match the costs per cloud instance. These are generally published for public cloud providers; however, some providers may use varying definitions and cost time periods. While multiple purchase methods are available, most consumers use one of two forms: On-demand and reserved instances. Other forms (such as spot) provide inconsistent performance and are typically not consumed by enterprise workloads and companies. The difference between on-demand and reserved options points directly to the company's commitment to run applications with the cloud provider. Essentially, the more commitment, the more attractive the pricing for instances. Price mapped instances based on the purchase option.

**Step 6:** Map the storage costs per cloud instance to the corresponding VM rather than in aggregate, and do not include data efficiency assumptions (such as thin, deduplication, and compression) as these are not supported by most cloud providers. Storage cannot be shared between instances; some cloud providers substantially overallocate storage while others charge storage per GB. Additionally, some cloud providers and products charge for transactions at a specified rate, but transactions may be difficult to measure and often IOPS are substituted. They are not necessarily the same thing. It is for this reason that many cloud providers have begun moving away from transaction-based costs and moving toward unlimited transaction offerings. *Figure 8-20* shows the mapping of the example instances to both AWS and Azure.

Name	Provisioned Storage (GB)	Used Storage (GB)	AWS EBS (GB)	Azure SSD Disk Premium	Azure SSD Disk Standard*
VM 1	70.7	22.318	71	P4 32 GIB	E10 128 GIB
VM 2	65.725	65.604	66	P10 128 GIB	E10 128 GIB
VM 3	257.266	136.49	258	P15 256 GIB	E15 256 GIB
VM 4	507.102	496.702	508	P20 512 GIB	E20 512 GIB

\* Azure Standard SSD charges \$0.001 per 10,000 transactions; any type of operation against storage is counted as a transaction, including reads writes, and deletes.

**Figure 8-20 Mapping Instances to Both AWS and Azure**

The difference becomes clear when approaching storage using the constraint method. Although, both AWS and Azure have alternatives or options within their storage offerings, we'll focus on the commonly used EBS and Managed Disk as an example. AWS' EBS storage allows for right-sizing storage volumes based on used storage, whereas Azure creates fixed artificial disks within the cloud. This difference impacts the cost of storage growth within the environment. With AWS, growth incurs increased cost as the volume is expanded, while Azure provides some buffer for growth until an additional disk instance is required. Note that both alternative storage options, for example BLOB or S3, carry variations of per GB and transactions costs. It is important to understand how all of these costs interact to analyze the total cost over time.

**Step 7:** It is important to understand how the cloud will provide support and what level of support is desired. Support options can range from a wide range of flat rates to variable, based upon a sliding scale. When modeling a TCO, it is important to not overlook these costs.

**Step 8:** Consider other services within the cloud and the associated costs when building the TCO. Costs within this category include directory services costs, external connection, IP with associated transactions, etc. We have found that these services often add an additional 20% above the basic cloud TCO.

**Step 9:** Consider any one-time costs that may need to be completed prior to moving to public cloud providers, such as application readiness development, WAN expansion to allow for communication between remaining on-premises applications and instances in the cloud, etc. Note that with pending accounting rule changes, some of these costs that previously could be capitalized may need to be amortized over the current year. Be sure to validate any modeling of amortization with your accounting department.

**Step 10:** Consider growth and bad behavior in the cloud. Taking too much or too little liberty in assessing growth may result in inaccurate cost results as the business expands. Typically, it is better practice to

average the cloud instances number, types, and costs. Growth can be estimated applying growth to the total number of instances and cost based on the average of the current measurable instances. This provides an ability to assume a typical average growth instance that is not based on the high nor the low of the existing.

Bad behavior operates a little differently. People tend to take the shortest or easiest path to completing tasks, such as starting another instance rather than cleaning off a former instance. Public cloud meters these unused cloud instances and charges for them. It is surprising how quickly they can add up. Luckily, finding the organization's risk of wasted instances is relatively easy with tools such as Nutanix Beam, CloudHealth, RIGHT SCALE, etc. Note, most companies will not want to count these unoptimized costs as a part of a TCO analysis. However, it provides a good reminder to not neglect cloud governance processes.

## Application TCO Example - Nutanix Era

ROI and TCO analysis isn't constrained to entire platforms. They can also be used to help show the value of individual applications or technologies. *Figure 8-21*, for example shows part of the Inputs tab for our new TCO tool built for Nutanix's new database operations automation product, Era. The "Inputs" tab collects information such as:

- Number of hours to provision a database
- Oracle and Era license costs
- Labor costs
- Time to market
- Productivity impacts
  - Reduction in Core DBA Effort
  - Reduction in Operating System Administration
  - Reduction in Application DBA Effort
- Reduction in Oracle License & Support Cost
- Reduction in Time to Market

## Inputs

<b>Database Provisioning Impact</b>	<b>Units/%</b>	<b>Source</b>	
First Year Hours to Provision a Database	40	Per Nutanix Experience	
Estimated Database Provisioning Improvement with Era	1	Per Nutanix Experience	
Estimated First Year Databases	350	Per Nutanix Experience	
First Year Provisioning Requests	100	Per Nutanix Experience	
<b>Time to Market</b>			
First Year Project Releases	12	Per Nutanix Experience	
Estimated Project Pipeline Improvement	40%	Per Nutanix Experience	
<b>Oracle License Costs</b>			
Oracle License Discount	12	Per Nutanix Experience	
Oracle Tech Support Cost	40%	Per Nutanix Experience	
<b>Benefit Ramp</b>			
	Year 1	100%	Per Nutanix Experience
	Year 2	100%	Per Nutanix Experience
	Year 3	100%	Per Nutanix Experience
	Year 4	100%	Per Nutanix Experience
	Year 5	100%	Per Nutanix Experience
<b>Labor Cost Assumptions</b>			
	<b>Number of FTE</b>	<b>Hourly Rate</b>	
Infrastructure Admin	\$1	\$42	Per Nutanix Experience
Application DBA	\$30	\$65	Per Nutanix Experience
Core Database Administrator	\$10	\$72	Per Nutanix Experience
<b>Nutanix Era Cost</b>			
Cores	50		
Era Discounted Unit Cost	\$1,000		
	<b>\$50,000</b>		

Figure 8-21: Nutanix Era TCO Inputs Tab

## Productivity Impacts

Reduction In CoreDBA Effort	Time Distribution	Reduction (LOE)	BAU (Hours)	Savings (Hours)	BAU (Dollars)	Savings (Dollars)	Source
Provisioning	20%	98%	4,160	4,056	\$300,000	\$292,500	Per Nutanix Experience
Data Management: Clone & Refresh	15%	90%	3,120	2,808	\$225,000	\$202,500	Per Nutanix Experience
Data Management: Backup & Recovery	15%	60%	3,120	1,872	\$225,000	\$135,000	Per Nutanix Experience
Patch & Upgrade	10%	75%	2,080	1,560	\$150,000	\$112,500	Per Nutanix Experience
Migration	10%	50%	2,080	1,040	\$150,000	\$75,000	Per Nutanix Experience
Performance Diagnostics & Tuning	10%	0%	2,080	-	\$150,000	-	Per Nutanix Experience
Documentation & Training	5%	50%	1,040	520	\$75,000	\$37,500	Per Nutanix Experience
Security	5%	0%	1,040	-	\$75,000	-	Per Nutanix Experience
Capacity Planning	10%	0%	2,080	-	\$150,000	-	Per Nutanix Experience
	<b>100%</b>		<b>20,800</b>	<b>11,856</b>	<b>\$1,500,000</b>	<b>\$855,000</b>	
<b>Estimated First Year Savings with Nutanix</b>		<b>15%</b>		<b>3,120</b>		<b>\$225,000</b>	

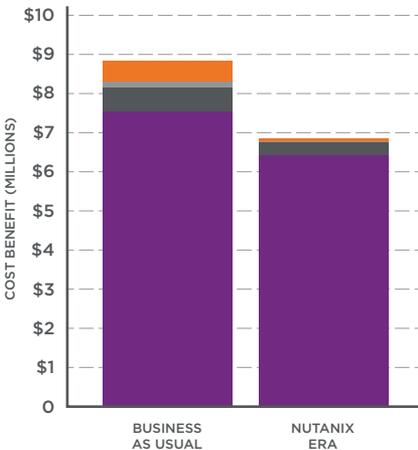
Figure 8-21: Nutanix Era TCO Inputs Tab Cont.

Figure 8-22 shows the Financial Summary Tab. This tab shows the projected savings with Nutanix Era vs. Business as Usual (conservatively assuming no decrease in Time to Market).

### Projected Savings

	Business As Usual	Nutanix Era	Summary
<b>Benefit Area</b>			
Core DBA Effort	\$7,500,000	\$6,375,000	\$1,125,000
Operating System Administration	\$650,000	\$325,000	\$325,000
Application DBA	\$130,000	\$65,000	\$65,000
Technology Licenses & Support	\$511,500	\$50,000	\$461,500
<b>Total Expense</b>	<b>\$8,791,500</b>	<b>\$6,815,000</b>	<b>\$1,976,500</b>
<b>Time to Market Benefits</b>	<b>\$0</b>	<b>\$0</b>	

5-Year Summary Cost Comparison



5-Year Cost Benefit Areas

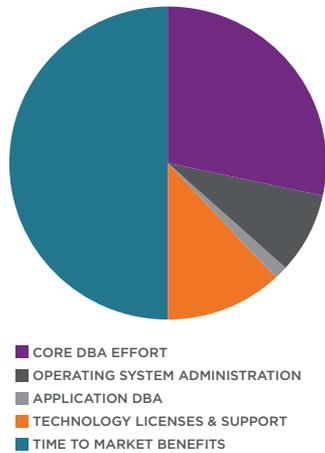


Figure 8-22: Nutanix Era TCO Financial Summary Tab

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## TIP 08

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*A financial analysis is a modeling exercise, it is NOT a budget.  
Don't get trapped into endless analysis iterations in order to  
show an exact accounting of costs for each alternative.*

The next chapter discusses wrapping the numbers into a financial narrative.

# 09

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## Pathos - Crafting and Presenting the ROI Story

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*“At the point of decision, emotions are very important for choosing....decision-making is much more emotional than it is logical. The ability to tell a good story is essential...A good story makes us think and feel, and speaks to us in ways that numbers, data, and presentation slides simply can't.”*

**Jim Camp**

Decisions are largely emotional, not logical:  
the neuroscience behind decision-making<sup>1</sup>

After establishing credibility (ethos) and crunching the numbers (logos), as discussed in the previous two chapters, it's time to channel your inner Steve Jobs or Elon Musk and develop an inspiring and emotionally compelling story. There is no magical formula for elevating what might otherwise be perceived as dry financial results into an emotion-grabbing (if not riveting) story, but this chapter discusses some methodologies and examples that can help.

## Crafting the Narrative

*“Our limbic brain is powerful, powerful enough to drive behavior that sometimes contradicts our rational and analytical understanding of a situation. We often trust our gut even if the decision flies in the face of all the facts and figures.”*

Simon Sinek, Start with Why<sup>2</sup>

### Collaborate

Collaborate with multiple customer employees. While the internal champion is typically the most reliable source for guidance, strive to actively engage other stakeholders as well. This includes the “naysayers” who can help identify challenges and concerns, both real and imagined, enabling you to address them as part of the analysis.

Perhaps, for example, the storage administrators are concerned their jobs will be eliminated. You can anticipate this fear and suggest, as part of the analysis, repurposing the storage team to more productive and value-added endeavors such as DevOps or analytics. It may even be possible to quantify the advantages to the organization. Channel partners, consultants, manufacturer reps, and other third-parties may also be able to contribute to a compelling narrative.

### Maintain Flexibility

Analysts, especially those who do it for a living, naturally try and fit

a TCO or ROI engagement into a standardized process that includes pre-built formulas and report formats. But as the customer internal champion, finance folks, naysayers, and other stakeholders become more engaged with the composition of the analysis, they often provide insights and perspectives that may shape the ROI story in a different direction. Collaboration, therefore, necessarily requires flexibility, which often necessitates slightly to heavily modified spreadsheets and report templates. Maintaining an open mind, listening to the customers' requests, and being willing to both customize and iterate as many times as necessary helps ensure both a captivating and compelling narrative.

## A Financial Story In Slides

Figure 9-1 shows an example of a summary slide from a PowerPoint deck comparing Nutanix enterprise cloud against a legacy 3-tier solution for a large bank. This slide does more than lay out a graphical executive summary. It also tells a story - incorporating key elements essential to good storytelling including Plot, Theme, Conflict and Resolution, and Characters.

### Nutanix is \$4.95M Less than [Redacted] & Improves Time to Market Benefits by \$1.6M Over 5 Years

#### Key Challenge to Address

Maintain industry leadership by getting to market more quickly

- Create "Invisible IT" through automation
- Deliver highly available, zero-day experience
- Simplify administration, management tools, & skill set required to support environment
- Standardize platform/eliminate tech silos
- Refocus highly skilled workforce into value-added activities

#### Solution Cost Comparison

Option (\$M USD)	CapEx	OpEx	Total
[Redacted]	\$5.55	\$8.53	\$14.08
Nutanix	\$3.46	\$5.67	\$9.13
<b>Difference</b>	<b>\$2.09</b>	<b>\$2.86</b>	<b>\$4.95</b>

Figure 9-1: An Analysis PowerPoint Deck Summary Slide

## Plot

The plot of an ROI narrative is the storyline. These vary significantly depending upon a great many variables, but here are some general guidelines our team follows:

- Identify business objectives
- Highlight current pain points
- Identify different solutions, including pros and cons
- Summarize the TCO/ROI between the solutions
- Dive into the details of the analysis
  - Detailed calculations
  - Cashflow by year/category
  - Proformas
  - OpEx & Run Rate
  - YoY P&Ls
  - Asset procurement analysis
  - Financial Summary
- Finish with recommendation and compelling consolidated justification.

## Theme

The theme is the main idea as well as the message you want the audience to grasp. In many cases, this means addressing how the disruptive solution will impact a key emotional component confronting the decision-makers. Is it a fear of falling into obsolescence due to lack of effective digital transformation? Is it a drive to be known as the most innovative firm in their industry? Is it a desire to raise the bar on their “green initiative?” Is it a mandate to cut costs?

To establish a compelling theme, we go back to the “why.” You must weave a thread throughout the analysis that demonstrates to the audience, via numbers and narrative, the positive business outcomes they can expect when the recommended solution is implemented.

*Figure 9-1* tells a story about automation, agility, simplification,

standardization, and efficiency, and these are the very objectives that drove the customer to undergo the analysis in the first place.

### **Conflict and Resolution**

The story should include resolution for the conflict identified in the theme. *Figure 9-1* conveys the story of saving lots of money (\$4.95M with the disruptive HCI solution vs. legacy) and generating additional revenues (\$1.6M realized by reducing time-to-market) over the next five years. But perhaps more importantly, it highlights a huge challenge the organization is facing – maintaining its industry leadership. The key emotion we tried to evoke was a fear of losing out to the customer’s primary competitor due to the inability to get to market more quickly.

### **Characters**

A good story has both heroes and villains. In a financial analysis, the villain might be the customer’s primary competitor who is pulling ahead because of a more agile infrastructure. Perhaps the CIO is the hero who is implementing a digital transformation initiative.

When the analysis evaluates disruptive infrastructure, it is not uncommon for the proposed solution to be perceived as both good and evil, depending upon the audience. An internal champion, for example, will hopefully cheer on the disruptive infrastructure as enabling the CIO to beat back the competition. But a legacy infrastructure administrator may try and position the disruptive infrastructure as inadequate. The same might be true of the new CTO hoping to make her mark by lifting and shifting IT to public cloud. The best outcome for the financial story is to educate all parties about the good and the bad of the of the alternative environments, and let the decision-makers come to their own conclusions.

*Figure 9-2* compares the villain (in this case 3-tier) vs. the hero in terms of database support and lifecycle management.

	[Redacted]	Nutanix
Entry Cost	High	Low (Fractional Consumption)
High Availability (N+1)	No N+1, if one compute node goes down you are 50% down	Yes, Nutanix provides N+1 capability
Flexibility	Proprietary, [Redacted]-specific	Multi-purpose
Portability	Database tuning is specific to [Redacted] appliance	Database tuning is portable
Database Support	[Redacted] Only	Oracle, PostgreSQL, MSSQL etc...
Complexity	High – Need specialized skills for Engineered Systems, InfiniBand	Low – Single Pane of Glass from VM-to-Disk
Operational Cost	Incremental growth is high because of [Redacted] form factor	Low – Modular Scale using Compute or Storage Only
Performance	Good	Good
Disaster Recovery	Yes	Yes

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**Figure 9-2: Comparing Features of Villain vs. Hero**

## Presenting the Story

*“We are not thinking machines that feel; rather we are feeling machines that think.”*

**Antonio Damasio**,<sup>3</sup> Professor of Neuroscience, Psychology and Philosophy at USC

Our team typically provides a comprehensive Word document as a “leave-behind” for our analyses. While much of the intended audience may not read the entire document, regardless of how riveting it might be, some will. And those who don’t will at least be able to see the logic, attention to detail, and effort that went into the analysis and conclusions. Additionally, generating the Word report helps us select the best content to put into an accompanying PowerPoint presentation.

The PowerPoint deck is an essential component of every one of our analyses. We always prepare a concise presentation of the analysis results to our champion, other IT staff, and to executives and key decision makers. The deck includes the most salient information, often in graphical format, delivering a crisp, clear problem statement, as well as findings and recommendations. We also tend to incorporate a variety of pictures, charts, and graphs to provide visual appeal. *Figure 9-3*, for example, is a slide using narrative bubbles to spice up some CapEx problem statements.

## CapEx Problem Statements

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### ISSUES WITH 3-TIER

### OVER PROVISIONING

### ISSUES WITH PUBLIC CLOUD

*Storage costs \$0.11 per GB per month = \$6.60 over 5 Years (x3 market price!)*

*"It takes me 3 months to deploy new hardware and \$100'000s to migrate storage so I will buy what I THINK I will need for the next 5 years in advance"*

*I need 2 VCPU and 24 GB Memory but the instance is for 8 VCPU and 26 memory.*

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**Figure 9-3: Spicing up the Narrative with Graphics**

*Figure 9-4* shows how charts can help the audience visualize projected cash flow costs for a 3-tier environment vs. HCI on a yearly basis.

### 3-Tier vs. Nutanix 5-Year Cash Outflows



**Figure 9-4: Showing Cash Outflows Comparisons on a Yearly Basis**

Figure 9-5 shows the same cash outflows, but now on a cumulative basis. This chart helps the audience see both the magnitude and growing delta between the two solutions over time.

### 3-Tier vs. Nutanix Cumulative Cash Outflows



**Figure 9-5: Showing Cash Outflows Comparisons on a Cumulative Basis**

## The Audience

Convey the story in a manner that resonates with the anticipated audience. If the CFO is a key reader and decision-maker, then the analysis should be weighted toward the financial metrics that will capture her attention. If the report is geared more toward the CEO, it might put more emphasis on the infrastructure's ability to enable long-term business objectives.

Nutanix Business Value Analyst Bill Thompson discusses his efforts to align the analysis presentation with the objectives of the audience.

*“Our discussions were focused on the LOB impacts because the CIO is very tied into the line of business. In fact, the bank’s personal wallet app, used for managing bank transactions and investments on the go, is front and center on almost every radio/TV ad. The focus of our discussions was less about the type of savings Nutanix enables and more about how we align to address internal and external customer service requirements (mission-critical applications and a data center migration). I would characterize the bank as relatively mature, we were engaged at the right level, and we had a transformational use case that impacted the LOB.”*

## Engaging the Audience

*“My wife told me a story about one of her college boyfriends who listened to her on the phone do math for several hours. Finally, she hung up the phone and thought ‘how bored can you be to listen to someone doing math?’ The bottom line is that people will see numbers or look at numbers, but will not hear them. This occurs when discussing the numbers of a financial analysis. It is critical to wrap the numbers within a story to allow the listener to ‘hear’ the numbers.”*

**Tim McCallum**  
Nutanix Director CS Finance

## A Common Starting Point

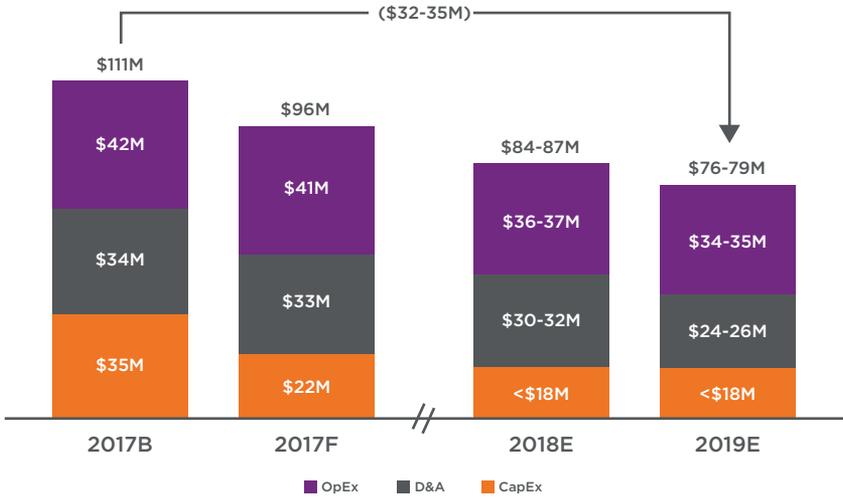
Imagine you are in a conference room ready to present the results of the TCO analysis you put together over the past couple of months. The room starts filling up with stakeholders. As a storyteller, your goal is to bring them on a journey from where they are to where you want them to go. This requires a common starting place. The starting place should be clearly defined, and ideally will be familiar to the audience.

I suggest creating characters in your story and having them use dialog to make your point. For example, Tim frequently tells the following story at Executive Briefing Centers (EBCs):

*“Those of you who have presented at conferences know that there tends to be a lot of downtime during rehearsals as you watch other presenters give their talks to the speech coach. At Nutanix .NEXT last May in New Orleans, I was sitting next to our customer, Kyle Seiter, CIO of Acelity. I turned to him and said, ‘Our time on stage will only be 30 minutes. Nutanix has had its AHV [native virtualization] story out there for quite a while, so we’re thinking that perhaps we cut out your AHV slide. We think can just mention it without any slides to save a little time.’*

*“Almost before I was finished, Kyle responded, ‘Keep it in there. A ton of my TCO savings were associated with being able to remove VMware hypervisors. Additionally, our internal NPS [Net Promoter Score] jumped from 44 to 77. The move in NPS reflected a shift in the satisfaction my employees now get from their jobs - and it’s largely due to a significant reduction in their administrative burden. Nutanix, including AHV, has helped free up resource cycles to spend more time solutioning for more important business needs.”*

## Kyle Seiter - CIO Acelity



### Results

**32%**

Cost Reduction in Total Cost of Ownership (TCO)

**87%**

Reduction in Infrastructure (Consolidated)

**32%**

Reduction in Management Resources

**48-77%**

Improved Internal NPS from 48-77%

The EBC audience sees the numbers and hears the story which associates the two, helping prevent just passive listening or merely seeing the numbers. Most people can relate to being stuck in a long line or waiting area and talking with the person next to them. It is a starting point that is nearly universal and natural, and that allows listeners to put themselves in the story. The numbers they see become real through the story they hear.

Following one EBC, an attendee approached Tim and said, 'I've been in hundreds of financial discussions and usually they are so dry my mind

starts wandering. But, your presentation brought the numbers alive and I was on the edge of my seat the whole time.”

## **Case Study: A Financial Analysis Presentation Story**

Here is Tim McCallum on his TCO analysis engagement with an industry-leading Fortune 25 company I'll call LargeCo.

*“Nutanix’s rep, Rex, set up a meeting with LargeCo on Thursday to look back at LargeCo’s Nutanix purchase and associated TCO analysis from a year prior and consider the new TCO for a big upcoming initiative. The storage manager, Quill, was pushing back against the new initiative – he was definitely not pro-Nutanix. But, we knew he’d be on vacation.*

*“On Thursday, Rex and I went to LargeCo IT headquarters. The room was set up with a projector and large wooden boardroom type table. In walks our lead internal champion, Mike, who immediately said, ‘Quill will be here. He changed his family’s airline flights to leave a day later.’*

*“The room filled up with the architects, those advocating for Nutanix on one side of the table and those advocating against Nutanix on the other side. Then in came a tall, heavy set gentleman. As he shook my hand he said, ‘Hello my name is Quill. I am here to make sure that you do this TCO correctly and don’t leave anything out.’ I pleasantly greeted Quill, and he took his seat to my left.*

*“We started by reviewing the TCO analysis we had completed a year ago. This TCO showed around 36% savings between LargeCo’s traditional 3-tier architecture and Nutanix Enterprise Cloud. Then we turned to the new TCO report. I explained the TCO process, the model and anticipated report deliverables. Quill sat and listened with his arms crossed.*

*“We projected the spreadsheet up on the wall and entered the use case based on the previous TCO analysis. As we got to the storage piece, Quill jumped in, ‘I’m not going to let you count the whole*

*storage array. The SAN will hold a lot more data than Nutanix!*

*"I said, "Okay, we can make this a pseudo array, but keep in mind that when you actually purchase the SAN, you will have storage that you are wasting until allocated – but you will still need to depreciate immediately."*

*"Quill replied, "You only get to count 25% of the storage array. That's \$500,000 for 100TB usable storage. Not the whole thing!"*

*"So, we input a pseudo SAN array of \$500,000 with 100TB usable storage and moved on. We worked through the server section and into the administrator sections. Quill jumped up again, 'I'm not going to let you remove storage administration. Someone has to manage the storage and we're not letting anyone go because of Nutanix.'*

*"I replied, 'Quill, storage in the sense of RAID configurations, LUN allocations and switch zoning like you're used to is not a part of Nutanix. It no longer applies. But if you wish, we can leave the administration cost there.'*

*"Quill quickly said, 'I will concede that you can show 15% administration reductions in the other areas you enhance.' We adjusted the administration time accordingly.*

*"As we were getting near the end of the input variables, Quill jumped in again, 'What about your switches? You need to add more switches and they need to be 10GB.'*

*"'Good catch!' I said. 'Let's add those switches Quill.' We spent a few minutes adding switches and then I said, 'Let's take a look at the results,' and switched over to the TCO savings graph. I continued, 'Okay, here we go. We have ~32% reduction with Nutanix over the traditional server, SAN and storage environment.' Quill jumped up and exclaimed, 'Knock the SAN down another 75%! It does thin provisioning!' I responded, 'Quill, we can do that, but is it realistic?'*

*"Quill: 'Knock it down 75%!'*

*"'Okay,' I said. 'We'll knock it down 75% on the storage.' I switched back to the TCO tab and said, 'The results in this case are obviously*

*reduced. They now show 27% savings, but we should ask ourselves if this is a realistic scenario or not.'*

*"Then came in a new voice, the IT Director of Applications, Camila, from the left side of the table, 'I think I get it now. If we use Nutanix we no longer have any need for the SAN or fiber channel SAN switches at all. We can deploy instantly from a single pane of glass application and can save money. We even save money when we take our SAN down to unrealistically low numbers.'*

*"'You are absolutely correct! You've got it now,' our champion Mike shouted from the right side of the table. Camila continued, 'This is really cool. I get it now.' 'Fantastic!', said Rex, 'We'll get you the finalized report by tomorrow. Right Tim?'*

*"'Of course,' I said.*

*"We delivered the TCO report the next day. About a week later, I received a call from Rex.*

*"'Tim, interesting news. Good for us, but not so great for Quill. Quill went from our meeting directly to the CIO's office. He stood there and told the CIO that our solution would not work. He said that only fiber channel on the SAN can deliver the speed they need.'*

*"The CIO called up both Mike and Camila and brought them into the room with Quill. Mike showed him all the technical speeds and findings they had over the past year of running Nutanix. Camila told him of her new understanding and thinking around Nutanix. In Mike's words, 'When we pulled out the TCO comparison from last year and, more importantly, the one you did last week, the CIO said that Nutanix is to be our standard across the datacenter. Quill began protesting again and the CIO said to him, 'Quill, this is the future. You need to get on board or find another place to work.'*

*"LargeCo went all in with Nutanix after this and has been converting technology across their data centers consistently since. Rex and I ran into Mike at .NEXT 2018 in New Orleans. Mike said, 'Remember Quill? He is no longer with LargeCo. He left a little while ago.' Rex and I chose not to inquire more about Quill. We just hoped that the change is for the better for him."*

## The Essence of Storytelling

*“Storytelling is part of the marrow of what makes us human. We see it in cave paintings, hear it in ancient songs, read it etched into stone and transcribed onto scrolls. But the truth is that the art of storytelling is even more relevant now in our modern world than ever. Between websites, webinars, podcasts, streaming video, recorded talks, and even good, old-fashioned one-on-one conversations, the way we tell the stories of ourselves, our experiences, our companies, our brands, and our ideas has the ability to reach and influence people to a degree unmatched in human history.”*

**Don Yaeger**

Eleven-times New York Times best-selling author and longtime associate editor for Sports Illustrated, [Don Yaeger](#),<sup>4</sup> is an internationally recognized master storyteller. I've had the pleasure of both hearing Don keynote and of taking his workshop on storytelling. Here are my takeaways from Don's 10-step framework for effective storytelling.

- 1. Identify Your Audience.** Always try to determine who the ultimate audience is, and tailor the report and presentation accordingly, including the degree of financial emphasis and type of language used.
- 2. Recognize What is Uniquely Yours.** When presenting the PowerPoint deck, you can share some personal experiences about the financial analysis process. This personal connection with the ROI story makes the telling of it more powerful while also making you more credible.
- 3. Evoke the Right Emotions.** Don says, “It is important to define the target emotions you want to invoke before you start thinking about how to frame your story. This will help you set the right tone as you endeavor to put yourself in your audience's shoes. If you can't empathize with them, you won't connect with them; if you don't connect with them, your message will be lost.”
- 4. Now do What?** It is important that you have a clear idea of what you are trying to accomplish. Is the report primarily geared toward educating the audience on the relative value of the disruptive solution, or is it meant to galvanize them into acting?

5. **Reverse the I/You Ratio.** While it is important to provide a personal connection, still ensure that the audience is part of the story. For example, instead of saying something like, “This solution helps reduce time-to-market,” say, “With this solution, you can reduce the time required for you to bring new applications on-line by a projected average of 8 weeks, equating to increased annual revenues of \$716,000.”
6. **Play with Detail – Carefully.** Set the scene for conveying key results of the analysis with specific details that draw the audience into the story.
7. **Dialogue.** Use dialogue to “show” the story to the audience. Instead of saying that frequent outages result in an average of 20 minutes a week of user downtime, talk about how Alisha struggles with upset customers as her system regularly fails to access crucial information.
8. **Use Pauses to Your Advantage.** Many analysts try to relay the metrics uncovered in the analysis as quickly as possible while they have their audience’s attention. Instead, use suspense and anticipation to draw your audience into the story.
9. **All the Things You Aren’t Saying.** Some experts believe that up to 93% of all communication is nonverbal. During the presentation, be aware of your body language and how it supports your message.
10. **Openers and Closers.** Don says, “First impressions matter, as do final impressions...it is so important to have your introduction and conclusion committed to memory – no stumbling, no searching for words, no backtracking to add in a detail. Your opening and closing need to be tight, powerful, and polished.”

## A Bias for Action

A producer putting on a play must coordinate a great many things. She must start with finding a good script that conveys the desired narrative, emotion, and message to the audience. She must hire a director, find a venue, audition cast, build sets, choose costumes, choreograph movement, schedule rehearsals, and on and on. But if everything goes according to plan, as the final curtain falls the audience will enthusiastically cheer in a standing ovation.

If the results of an ROI analysis indicate a positive economic case for the disruptive infrastructure solution, the next step is to weave those numerical results into a compelling narrative. The narrative should include the hot buttons, pain points and visionary aspirations to grab the audience emotionally. It should, ideally, be so compelling that they have no choice but to move forward with the recommended initiative.

## ROI Story Conclusion

All the work of putting together a comprehensive analysis should result in a confident recommendation. And while a good “review” by the audience is welcome, nothing is as gratifying as an organizational decision to move forward with the recommendation.

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# TIP 09

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*Determine your ultimate objective before wrapping a story around the numerical analysis.*

In the next and final chapter, we discuss how an analyst can help ensure the success of an ongoing project, especially in alliance with a customer success organization.

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Ensuring  
Customer  
Success

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ended Chapter 9 with a subheading titled, ROI Story Conclusion. But often, presenting a comprehensive financial analysis – even if it results in project approval – is not the end of an ROI story. Migrating to a software-defined infrastructure is a big endeavor, commonly entailing technical or political snafus. As an analyst, you can use the analysis as a touchstone, reminding stakeholders of why the organization undertook the initiative in the first place, and of the tremendous benefits that await.

Most larger organizations deploying a disruptive infrastructure solution such as HCI or public cloud don't try an immediate "lift and shift." They instead follow a migration path over time. You can help justify further expansion of the disruptive infrastructure from point solution to enterprise platform by engineering the financial case. In this capacity, your position shifts from storyteller to a true trusted partner role with the business.

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## TIP 10

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*The analyst should help publicize successful POCs, betas, and roll-outs internally to keep the disruptive infrastructure momentum growing.*

## Customer Success Organization

As part of the journey to a software-defined infrastructure standard, organizations commonly face significant changes to operational processes, including security, governance, and change control. In larger organizations, disruptive infrastructure adoption may sometimes slow down or even stall after the initial use case. The issue is typically not due to technology limitations, but rather to other pressing projects, daily fires, or simply a widespread lack of understanding of the solution's benefits.

Nutanix, and many other disruptive technology manufacturers, help overcome these challenges through the creation of a Customer Success (CS) organization. Nutanix CS partners with strategic enterprise customers to assist them in their ongoing journeys to HCI as an integral part of a multi-cloud architecture. CS helps identify and remove the obstacles that can block wider and faster adoption of the new technology while driving exceptional customer experience.

Nutanix CS strives to deliver success over the course of three phases:

- Understanding the customer's business objectives
- Assessing enterprise readiness
- Developing and executing a joint success plan with the customer

As *Figure 10-1* shows, the three foundational pillars of assessing enterprise readiness include: Operational Efficiency, Organizational Proficiency, and Financial Accountability. CS Finance analysts focus both on ROI realization and on cost optimization – aligned with Financial Accountability, though closely collaborating with the teams focused on the other two pillars as well.

Following are a few examples that show how CS Finance partners with enterprise customers to help accelerate their journeys to a successful HCI or multi-cloud architecture.

## ENSURING CUSTOMER SUCCESS



**Figure 10-1: The Assess Enterprise Readiness Phase**

### Expanding the HCI Platform at JetBlue Airways

Executive Vice President (and my boss), Inder Sidhu, runs the Nutanix Customer Success organization. Inder is a New York Times best-selling author of two books. His most recent, [The Digital Revolution: How Connected Digital Innovations Are Transforming Your Industry, Company & Career](#),<sup>1</sup> includes several references to Fortune 500 company, JetBlue Airways. The airline is a leader in customer satisfaction and, as Inder writes, “...leverages digital technology to engage customers to create great customer experiences.”

JetBlue also happens to be one of Nutanix’s designated Customer Success accounts. While JetBlue started with HCI for its Citrix VDI deployment, it has since standardized on Nutanix across the organization. Dan Feliz, General Manager Information Technology Infrastructure for JetBlue stated in an [August 06, 2018 video](#),<sup>2</sup>

*“At JetBlue we operate about 1,000 flights every day for anyone of our 42M customers to any one of our 100+ destinations. As our customers make the decision to fly on our airline, every piece of that experience is anchored in high technology whether it’s managing our aircraft, or managing our crews, or processing transactions for our customers, technology really enables our business to succeed...Innovation is in our DNA, and what we love about the relationship we have with Nutanix is that innovation is also in their DNA – and when you bring those two things together, great things happen.”*

Bill Thompson, a Business Value Analyst on the CS Finance team, has worked extensively with the airline to help evaluate and justify expansion not only of Nutanix HCI, but of the growing Enterprise Cloud suite of offerings. Here is Bill’s description of how his analyses are assisting JetBlue with enterprise adoption of the software-defined infrastructure.

*“JetBlue is a disruptor in the airline industry. They introduced amenities such as distributed live TV, paperless boarding, and big leather seats. Both Eash Sundaram (CIO) and Dan Feliz described their goal as moving beyond a perception of IT as ‘order takers.’ They wanted to shed a lot of their technical debt and simplify operations for their hosted datacenter. This requires disruption of their infrastructure, and my role was to facilitate a series of discussions to understand the key capabilities required, determine how Nutanix addresses their needs, and then determine the financial impact of achieving their goals. An important output of the process is that it provides a discussion platform for various roles and disciplines within a business to share perspectives. This not only gives the customer confidence in the potential financial value, but enables a strategic roadmap that plots the relative value versus complexity for implementing the solution as well.*

*“I’m currently working on helping JetBlue evaluate Nutanix Calm for DevOps and Era for database lifecycle management. I am also, as part of our standard Customer Success financial engagement practice, starting a ‘look back’ analysis even though JetBlue told us they are absolutely convinced Nutanix is one of the lowest cost providers. I want to focus on determining whether they have realized the promised operational improvements.”*

## **Accelerating Digital with Tractor Supply Company**

For over 80 years, Tractor Supply Company (NASDAQ: TSCO) has stayed relevant by listening to its customers and continuing to evolve and innovate, while maintaining a strong focus on mission and values. Tractor Supply provides customers a convenient shopping experience for recreational farmers, ranchers, and all those that enjoy living the rural lifestyle. With nearly 1,800 stores across 49 states and revenues approaching \$8 billion, Tractor Supply is the largest rural lifestyle retailer in the United States with over 160 million customer transactions each year.

Tractor Supply has an innovation mindset that helps it keep ahead of the competition. As an early adopter of Nutanix, the Enterprise Cloud platform has enabled Tractor Supply with the core and foundational technology platform to fuel digital transformation into the future. This is enabling true business results, such as improvement with speed and performance of systems and the ability to achieve business objectives.

*“With the pace of change increasing, it is more critical than ever for retailers to be in a position to respond quickly to the constantly evolving needs of customers. We’re seeing real business results with adoption of enterprise cloud technology, including the ability to accelerate delivery of new digital capabilities to make it easier for customers to shop anytime, anywhere, or anyway.”*

**Rob Mills, EVP, Chief Technology,  
Digital Commerce and Strategy Officer**

During my ROI panel at .NEXT, I had the opportunity to discuss retail innovation with Glenn Allison, VP of Enterprise Architecture, Governance & Innovation Labs at Tractor Supply Company. As discussed on the panel, Tractor Supply's former 3-tier infrastructure took up a lot of data center space and required a lot of administrative effort and money. Combined with limited agility, the previous technology architecture was challenged to meet the retailer's rapid growth demands. Nutanix Customer Success Manager, Tod Holsenbeck, has worked closely with Tractor Supply IT team to assist in migration to the Nutanix Enterprise Cloud platform. Tractor Supply now has core technology architecture in place to support growth, while also being more cost-effective to operate.

*"We've migrated the majority of workloads in our datacenter over to the Enterprise Cloud platform. Nutanix is constantly innovating and bringing new capabilities to the market for their customers."*

**Glenn Allison, VP, Enterprise Architecture,  
Governance, and Innovation Labs**

Looking forward, Tractor Supply is embracing change and continuing to drive a level of innovation in the retail industry. This includes the use of artificial intelligence and machine learning to personalize the customer experience and drive new insights using data. The Company is also investing in emerging technologies, such as augmented reality for customers to see products virtually in their own setting, introducing new "smart" products online, and use of robotic process automation to drive greater efficiency with processes.



## Restructuring the IT Org

Traditional functional IT silos tend to be both inefficient and ineffective at providing the agility an organization needs to compete in a digital world. A December of 2013, McKinsey & Company report titled, [Using a Plan-Build-Run Organizational Model to Drive IT Infrastructure Objectives](#)<sup>3</sup> says that traditional technology-aligned organization is suboptimal:

- No single owner can define, manage, and ensure delivery of standardized and integrated services across technology domains to meet business needs
- Model lacks an effective customer-delivery function to optimize incoming demand and drive financial transparency
- Design decisions are made within each domain in isolation but may have significant impact on integrated cost and performance across technologies

- Lack of accountability drives custom solutions
- Many handoffs and much back-and-forth among groups (e.g., servers, storage) are required to build an infrastructure solution
- Having “build” intertwined with operations limits ability to have flexible capacity through vendor involvement
- Incidents are “tossed” among technology silos to resolve issues

Disruptive infrastructure, whether on-premises HCI or public cloud, should make the IT organization more efficient which, of course, means change. As traditional IT organizations migrate from a legacy environment to a software-defined infrastructure, they should consider shifting functional silos of storage, server, virtualization, and network teams to a converged team with resources from the individual groups. Over time, they can completely switch the organizational structure to coincide with the hyperconverged (if on-premises) infrastructure.

### **Joseph Wolfgram & Healthcare IT**

I had the pleasure of working with VP and CTO of a large healthcare organization (and Nutanix CS customer), Joseph Wolfgram. We collaborated on TCO and ROI analyses that helped him build the business case for replacing the healthcare organization’s previous converged infrastructure architecture with the Nutanix HCI platform.

Joseph is a keynote speaker, author, NLP practitioner, and podcast host. He has a long history of healthcare IT senior leadership, though earlier in his career he held positions of Chief Software Architect at TeleData International and Director of Technology Resources at the University of Miami. He also started the IT department for the Bill and Melinda Gates Foundation. Joseph’s diverse background and experience prepared him to make significant organizational changes as part of deploying Nutanix HCI. Here is his explanation as to how he put a variation of the McKinsey model to work at his firm.

*“When we migrated away from our legacy IT environment built upon a converged infrastructure platform manufactured by the industry leader to Nutanix HCI, the application owners initially had some concerns. But they quickly heard back from their users about faster log-ins and faster response times – so they jumped on board.*

*“On the other hand, we did have some genuine concerns about our legacy IT silo organizational structure – particularly in how the storage team would likely defend their turf while the network and server teams would probably be upset to see storage folks being in their business. We instead implemented a DevOps-like model of Plan, Build, Operate comprised of people planning to put products onto the HCI infrastructure, building products for the infrastructure, and operating those services in production.*

*“The new model has worked out exceptionally well for us. We were able to reduce the number of IT staff overall while aligning our IT staff with the technology. Via audits in conjunction with our IT Financial Management partners, we’ve tracked the cost of deploying technology to our users – and it has declined significantly. Even more important for a healthcare organization, clinical worker productivity has improved, which in turn enables us to further enhance patient care.”*

## **Implementing DevOps at a Top 10 Hedge Fund**

Prior to joining Nutanix to head up the financial vertical for Nutanix Customer Success, Dan Sarrosick spent 18 years in finance industry roles, ranging from developer to Vice President of IaaS. For 3 and a half years, he was head of compute for a top 10 hedge fund with assets under management of more than \$33B. Dan oversaw servers, storage, and virtualization, including both operations and engineering. Here is Dan’s story about the impact of Nutanix Enterprise Cloud at the hedge fund.

*“I took over the Compute team a few weeks before our annual DR test was scheduled. Since I was new to the team, I wasn’t part of preparation, but was ultimately responsible for its success. And indeed, almost everything worked other than VDI. The problem was that VDI was our most visible service because all the developers, quants, traders, etc. all needed their virtual desktops in a disaster situation.*

*“Because the hedge fund was running a leading converged infrastructure platform, I assumed that it would be easy to remedy the DR snafu because of the expectation of the one throat to choke support model. It was not. The whole ordeal was a nightmare entailing eleven hours of phone calls to various parties and finger pointing between involved vendors. We never were able to get it resolved.*

*“I quickly saw that there was a general disappointment in infrastructure that went well beyond failed DR expectations. It became clear to me that infrastructure at a midsized, nimble company such as this, was a means to an end, not an end in itself. No one was going to get a big bonus for failing over a LUN. The business just wanted infrastructure to work so they could get back to doing the things that made them a successful business in the first place.*

*“I went on a search to find a simpler infrastructure solution, and after evaluating a great many solutions, found Nutanix. I had dinner with the CEO before making a final decision. Dheeraj, the CEO of Nutanix, told me that Nutanix’s perspective is that infrastructure should be invisible! This was exactly the sentiment I was looking for, and after extensive financial justification, testing and piloting – we made the migration to Enterprise Cloud.*

*“The effect on IT was remarkable. What once took 4 people to maintain in the converged infra space now took less than 2 people for day to day maintenance using Nutanix. We used the remainder of the team’s time to give birth to the first infrastructure-led DevOps initiative at the firm.*”

*“On top of Nutanix, we built our first DevOps offering, enabling our development teams to describe their infrastructure needs as code, deploy their instances without any human intervention and QA check the output in an automated fashion. We built an automation pipeline using tools such as Chef, Ansible, Jenkins and Git (this was before Nutanix Calm, which automates the process) which would result in an instance created either on-site or at AWS. This enabled the firm to treat off premise cloud capabilities in a more similar way to how they treated their traditional compute assets. The organizational change was remarkable for me to see as a leader in the firm. A group of people who were accustomed to dealing with low level infrastructure nuts and bolts, receiving regular criticism about infrastructure issues, now transitioned to become valuable partners to the business, helping automate QA testing, development planning and code deployment. By reducing the time spent on non-value-added infrastructure nuts and bolts, we had become a better partner to the business.*”

*“The TCO story was easier to demonstrate for Nutanix than other disruptive technology for which I built justification models at previous jobs. The biggest selling point was reducing time-to-market. While Nutanix brought us an array of benefits, we sold the idea to our CIO by focusing on this one thing. It used to take around 2 months to spin up a VM given all the processes, manual connection points and human discussions. By combining Nutanix as the core building block with an array of automation tooling, delivery time for our most common instance types decreased to 30 minutes. Over time as delivery became more consistent, the firm’s confidence level*”

*in virtualization technology improved, enabling us to virtualize drastically more than we had done in the past.*

*“I still work with the hedge fund closely in my CS role at Nutanix, and am in close touch with the IT staff there. I believe that there is a big opportunity for Nutanix Karbon to natively deliver Kubernetes services rather than having to build such capabilities in-house. The same logic applies to replacing the Ansible/Chef multi-cloud automation with Nutanix Calm. Nutanix is helping them step away from complicated customizations as well as stay on the DevOps journey.*

*“The most exciting thing I’ve seen in my career was the blurring of organizational boundaries from DevOps practices. When the development teams – folks who traditionally didn’t trust infrastructure people, and infrastructure teams – folks who didn’t trust, or often-times even know, developers, work together the benefits to a firm are massive. Seeing these two historically divergent sides in the same room, trusting each other, writing code together and eating pizza together is the stuff that fuels a leader. Of course, every new change must be financially justified, but these kinds of changes deliver benefits to a company well beyond dollars and cents.”*

## **Chargeback at San Mateo County**

As organizations journey to HCI, the IT departments tend to adopt the persona of a cloud provider, including evaluating efficiency with metrics such as cost per square foot (or meter). And like a public cloud, though hopefully with much simpler invoices, they often deploy either a chargeback or showback model to encourage efficient use of IT resources.

In 2013, the CIO of San Mateo County, a Nutanix CS account, made an early bet on Nutanix HCI by bringing it into the County for an initial VDI use case. Within 6 months, his IT staff was expanding the solution to other workloads. By 2015, the County’s 3-tier infrastructure was up for refresh, and the IT staff was considering going “all in” with HCI by moving their 1,200 remaining VMs over to Nutanix.

Long before adopting HCI, the county’s IT department had taken on the role of service provider to the many cities and agencies – to the point where it needed to “sell” its services. The IT staff asked for my assistance in helping develop an HCI chargeback model that they could use (this was years before Nutanix introduced its own more sophisticated chargeback/showback solution). The IT staff also asked me to see what the chargeback costs would look like if they maintained their legacy 3-tier environment.

The analysis was fairly elaborate and I worked different scenarios utilizing various assumptions. *Figure 10-2* summarizes my projected results for a sample agency using the county’s 3-tier environment. Allocating the \$285,000 for refreshing the legacy infrastructure among 94 VMs over a 4-year period equated to an average cost of \$63 per VM per month for IT to break even.

	VMs	Allocated Memory (GB)	CPUs (GHz)	Allocated Storage (TB)	Total Cost	Mo. Cost Per VM Over 4 Yrs
SAN + Servers	94	446	37	27.7	\$285,000	
Ave per VM	1	4.74	0.39	0.29	\$3,032	\$63
Outliers	8	120	2.08	8.80	\$90,542	
Outliers as % of Total	9%	27%	6%	32%		
Ave. Outliers (per VM)	1	15	0.26	1.1	\$11,318	\$236
W/O Outliers	86	327	22.5	18.9	\$194,458	
W/O Outliers as % of Total	91%	73%	61%	68%		
Ave w/o Outliers per VM	86	3.8	0.26	0.22	\$2,261	\$1

**Figure 10-2: Projected San Mateo County Chargeback for 3-Tier**

*Figure 10-3* shows the chargeback calculation for the Nutanix software and associated servers. Although the total cost is similar to that of 3-tier, the 60% higher VM density results in a Nutanix breakeven cost of only \$39 per VM per month.

	Est. VMs	Allocated Memory (GB)	CPUs (GHz)	Allocated Storage (TB)	Total Cost	Mo. Cost Per VM Over 4 Yrs
Nutanix & Servers	150	928	83.2	40	\$281,000	
Ave per VM (Nutanix)		9.87	0.89	0.29	\$1,873	\$39

**Figure 10-3: San Mateo County Chargeback Calculations for Nutanix HCI**

Figure 10-4 shows the county's simplified chargeback model for the Nutanix HCI scenario.

	Outlier Cost	Total Cost
Cost per Month for Basic VM		\$30
Outlier Cost for 2 vCPUs (6% of Total)	\$12	\$1
Outlier Cost for GB memory (27% of Total)	\$1	\$3
Outlier Cost for 100 GB storage (32% of Total)	\$0.50	\$5
Total Monthly Revenues per VM		\$39

**Figure 10-4: San Mateo County Chargeback Model for Nutanix HCI**

The funny thing is that the County's Infrastructure Services Manager, Bill Keating, had been working independently on his own chargeback model. Despite using somewhat different assumptions from me, he also had arrived at the exact same HCI chargeback cost of \$39. I say "funny" because a financial analysis is not an exact science or budgeting process. The intent is to provide IT leadership with increased clarity around their infrastructure options to enable an optimal strategic decision. I arrived at the same cost per VM figure as Bill not due to any type of financial wizardry – it was just a lucky coincidence. Still, it clearly impressed the county's IT leadership – I suspect they couldn't help but feel an aspect of increased credibility that an independently derived external projection exactly matched an internal number.

This story helps illustrate the importance of the parts that both credibility and emotion can play in developing a successful financial narrative. Disruptive infrastructure is...well, disruptive. A decision-maker wants to feel an emotional connection to the new platform in order to maintain confidence that she is making the right decision for her organization.

*“Our story is much more about our engineers than me. They are the ones that did all the work with Nutanix from the very beginning. They still feel a very close and positive partnership with Nutanix after all of these years.”*

**Jon Walton, CIO San Mateo County**

I started this book off with a quote from San Mateo County CIO, Jon Walton. Among his many awards the past few years, Jon was named the 2017 Bay Area CIO of the Year. IT leaders deserve recognition for deploying disruptive infrastructure within their organizations. Going against the status quo requires both determination and fortitude. It entails sticking their necks out, which is one reason a comprehensive financial analysis makes sense – to help identify and mitigate both perceived and real risk. Wrapping a story around the analysis then helps the internal champion inspire the CIO, IT staff, executive leadership, and other stakeholders into moving forward with the optimal platform for the organization.

## Cost Center or Innovation Center?

The tacit assumption throughout this book is that the organization treats IT as a cost center. That is certainly the case today for by far the majority of organizations. Even those firms protesting that they look at IT as an innovation center are likely to evaluate new infrastructure technologies based primarily upon cost rather than on their abilities to achieve business outcomes. The preponderance of RFPs and tenders testifies to this cost center mentality.

It is inevitable, however, that organizational perception of IT will increasingly shift from cost center to the source of digital transformation innovation. Financial analysis also must evolve. IT as innovation center demands new approaches to evaluating infrastructure and other technology purchase decisions. If an organization, for example, is able to make an IT-enabled business change that doubles its value, the ROI analysis metrics of the past can look quite silly. In that case, the focus would necessarily need to shift to proof of value for the business transformation.

Perhaps the ultimate business value metric, at least for publicly traded organizations, may be found in Earnings Per Share. But we are not there yet – at least for most organizations that still run legacy SANs and associated 3-tier products. Optimizing business value depends upon flexibility. And maximum flexibility depends upon software-defined infrastructure.

## The ROI of ROI

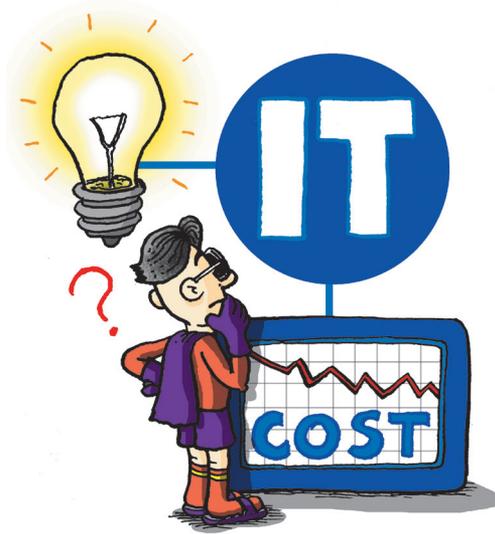
As mentioned in the Preface, I undertook the writing of this book without making any effort to undertake an ROI analysis. There are certainly many legitimate scenarios where it makes sense to move ahead with a project simply based upon passion or emotion or a vague sense of personal gratification, rather than a rigorously quantified economic evaluation. Deploying an infrastructure solution such as HCI, public cloud, or really any disruptive technology, is not one of those cases.

I realize that your biggest cost, by far, in reading this book is the time you spent doing so. I hope that you have picked up some ideas that prove worthwhile, and that you realize a solid return on that investment going forward.

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# TIP 11

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*Determine whether the customer views IT as a cost or innovation center, and tailor the analysis accordingly.*

# NOTES

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I also am very grateful for all of the content, contributions and editing of Tim's team in the US and APAC: Kelly Craig, Jerrod Latham, Apratim Sau, Harish Sundaram, and Bill Thompson. These analysts bring a wealth of financial background that have enabled us to consistently raise the bar when it comes to analyses that resonate. A special note of thanks to Jerrod who was relentless in his thorough editing of the book.

The same is true for Hamut Pascha and his EMEA team of Steen Dalgas, Anthony Samaha, and Ross Down. Nutanix's European business continues to boom, and Hamut and team are big contributors to helping customers not only optimize financial decisions, but also how to structure them from a licensing and financing perspective.

Thanks to the Nutanix Customer Success team for their support and assistance with setting up customer interviews, and to Don Mimms, Don Sarrosick, and several other Nutanix for their customer stories. Thanks to Marketing for their help with the book graphics and formatting and to CIO, Wendy Pfeiffer, for her perspective.

Last, but certainly not least, thank you to the many customers mentioned in this book as well as the hundreds of other customers with whom our team has worked over the years. It takes a lot of courage to invest in a new disruptive infrastructure solution. It also takes an open-mindedness to work closely with the solution manufacturer's analyst team. We appreciate their trust and look forward to many more ROI stories as they continue to expand their software-defined infrastructure.

# ABOUT THE AUTHOR

Steve Kaplan is Vice President of Customer Success Finance at Nutanix where he heads a team of business value analysts across the globe who use a financial analysis perspective (ROI/TCO) to help enterprise customers and prospects quantify different on-premises and cloud-based infrastructure options. Before starting the Nutanix business value practice, he started and ran the channels sales organization for the Americas. *CRN Magazine* named him one of “The Top 25 Channel Sales Leaders of 2015.”

Prior to joining Nutanix in early 2013, Steve started, ran and sold two internationally awarded IT channel partner firms. Along with writing hundreds of articles and white papers, he has co-authored five books (11 editions in all) on Citrix and VMware technologies, as well as the *VirtualMan* comic book series. Kaplan has held positions on the advisory boards of several industry manufactures and was a Microsoft MVP for four years. He is one of around ten people named a VMware vExpert for the first ten years of the program, and was one of three people on the EMC pre-sales advisory council.

Kaplan initiated the first utility program (PG&E) to provide incentives to customers that virtualize, and has a patent (pending) on a financial modeling methodology and an associated algorithm. He holds an MBA from Northwestern Kellogg Graduate School of Management and a BS in Business Administration from UC Berkeley.

**Follow Kaplan on Twitter:** @ROldude

**Web site:** [www.bythebell.com](http://www.bythebell.com)

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- Acquire necessary insights and understanding to enable the optimal strategic infrastructure decision for your organization using figures and facts.
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**Tim Crawford, CIO Strategic Advisor**

*“To be a transformational CIO leader, you must be able to speak the language of business. In this book, Steve does an excellent job demonstrating how you can turn financial analysis into a powerful storytelling weapon to help drive your organization forward.”*

**Jay Ferro, CIO, The QUIKRETE Companies**