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Introduction

There are three things that dominate 90% of technology conversations today: AI, cybersecurity, and cloud—we’re guessing you figured out what this book is about by the cover. (And we know you’re wondering: the animal is a black swan—quite fitting when you think about the state of the world when we started writing the book.)

Collectively our authoring team has well over a century of IT expertise and that means we’ve seen a lot of stuff (we had a different word in here, but it looks like the editor changed that). If you’ve ever stumbled across the [Gartner Hype Cycle](#), you’ll know that just because a technology is the “talk of the town,” it doesn’t guarantee success in the grand scheme of things. We’ve found that even for those technologies that find their way out of Gartner’s “Peak of Inflated Expectations” and into the “Plateau of Productivity” part of their Hype Cycle curve, the calculus can still become a damp squib (a wet firework that fails to go off). Time and time again, we see an upstart technology that becomes all the rage, but just doesn’t quite manage to stick the landing the first time: Knowledge Graphs (we still think something will happen here), Learning Gamification (at least the way most people implement it), governance (most organizations have a least effort to comply approach), and Hadoop...just to name a few.

Let’s be clear on something: *Cloud is not in a hype cycle!* In fact, it’s one of the most significant platform inflection points of our time (especially when you start thinking about cloud in the way we describe it in this book). It’s true, sometimes we look at each other and say, “I can’t even keep a cell phone connection, how is the world going to totally run on cloud?” Make no mistake about it, cloud is here and it’s here to stay—you need to pivot the way you think about cloud if you want to get all you can out of it.

However, we’ve found that most businesses aren’t getting the value out of the cloud that they were expecting (the mental model around cloud was too narrowed by the hype). Some might feel that there’s more value yet to be uncovered, other organizations are guilty of not even knowing what to expect (just like AI, many jumped on the

notion that the gains will be instant—like magic), and some are even repatriating public cloud workloads back to their traditional runtimes. Why? Too many compromises.

How do you get to cloud without compromise? It's not a vendor thing. We're not here to tell you the only way to get cloud without compromise is to migrate everything to a particular vendor's public cloud. For example, while we think there are nuances for specific types of applications that make the IBM Public Cloud a standout (highly regulated industries like finance), other public cloud providers have their own characteristics that are differentiated too (take a look at the catalog and configuration options on AWS).

There are two things to really grasp before you can get to a cloud without compromise. First, internalize what will become a mantra of this book: *cloud is a capability, not a destination*. Cloud without compromise means you're shifting your mindset from a place to an *operational model*. Second, cloud without compromise means you're embracing a unified distributed hybrid cloud strategy. A *hybrid cloud* unifies public cloud, private cloud, and on-premises infrastructure with consistent management and orchestration to create a single, flexible, cost-optimal IT infrastructure (the distributed part means it doesn't matter what vendor you select for your public cloud resources. Let the gravitational pull to a cloud vendor be the strengths—its cloud capabilities—that uniquely serve your business. This is why we'll advocate again and again for looking at cloud as a capability (instead of a destination), so that your business and the things it needs to be successful can run (and interoperate) anywhere to everywhere. The outcome? Companies with a no compromise cloud strategy are empowered businesses that can:

- Combine best-of-breed cloud services and functionality from multiple cloud computing vendors
- Choose the optimal cloud computing environment for each workload
- Move workloads freely between public and private cloud as circumstances change

When no compromises are made, companies are free to pursue their technical and business objectives more effectively and cost-efficiently than they would otherwise be able to through any single public or private cloud vendor alone. In fact, according to one recent [study](#), companies derive up to 2.5x more value from a hybrid cloud strategy than from following a single-cloud, single-vendor approach.

Initially, hybrid cloud architectures focused on the mechanics of transforming portions of a company's on-premises datacenter into private cloud infrastructure, and then connecting that infrastructure to public cloud environments hosted off-premises by a public cloud provider. Today's hybrid cloud architecture needs to be focused less on physical connectivity, and more toward supporting workload portability across all

cloud environments (the location or vendor doesn't matter) and on automating the deployment of those workloads to cloud environments (again, agnostic to vendor or location) with the most gravitational pull for your application's needs.

Several trends are driving this shift. As part of the next critical step in their digital transformations, organizations are building new applications (and modernizing legacy applications) to leverage cloud native technologies—technologies that enable consistent and reliable development, deployment, management, and performance across cloud environments and across cloud vendors, including on-premises infrastructure. Specifically, they're building and transforming applications to use microservices architectures, which deconstruct unwieldy monolithic applications into smaller, loosely coupled, reusable components focused on specific business functions. And they're deploying these applications in containers—lightweight executable units that contain only the application code and just enough of the virtualized operating system dependencies required to run it. These technologies serve as a foundation for enabling businesses to drive a new-age culture of productivity, such as development cycles that last days or weeks (instead of quarters or years) and the inclusion of highly effective methodologies like test-driven development, continuous integration and continuous delivery (CI/CD), A/B testing, and more.

At a higher level, public and private clouds are no longer physical “locations” to connect together. For example, many cloud vendors now offer public cloud services that run in their customers' on-premises datacenters. Private clouds, once run exclusively on-premises, are now often hosted in off-premises datacenters, on virtual private networks (VPNs) or virtual private clouds (VPCs), or on dedicated infrastructure rented from third-party providers (who may happen to be public cloud providers).

What's more, infrastructure virtualization with the aid of automation (infrastructure as code) allows these environments to be created, on demand, using any resources located behind (or beyond) a firewall. This takes on added importance with the advent of edge computing, which offers opportunities to improve global application performance by moving workloads closer to where data is created and consumed.

Cloud native development makes it possible for developers to transform monolithic applications into units of business-focused functionality that can be run anywhere and reused within a variety of applications. A standard operating system (like Linux) lets developers build any hardware dependency into a container. And Kubernetes orchestration and automation delivers granular, set-it-and-forget-it control over container configuration and deployment—including security, load balancing, scalability, and more—across multiple cloud environments. (Don't worry if you don't know anything about what we just wrote; this book is going to teach you about all of this.)

We talk a lot in this book about the untapped cloud value that remains for those downtrodden on their cloud journeys. To the uninitiated, they might think, “Yes, that means if I move everything to a public cloud vendor, I will get all this value.” That’s not what it means—remember, cloud is a capability, not a destination. But the right cloud strategy (which you’ll learn how to craft in this book) will certainly deliver:

Improved developer productivity

This helps expand the adoption of Agile and **DevOps** methodologies, and enables dev(elopment) teams to build once and deploy anywhere.

Greater infrastructure efficiency

With on-demand granular control over rapidly provisioned compute and storage resources, development, and IT operations, teams can optimize their spend across public cloud services, private clouds, and cloud vendors. Hybrid cloud also helps companies modernize applications faster and connect cloud services to data on cloud or on-premises infrastructure in ways that deliver new value.

Larger breadth and depth

Access to a larger number of services spanning AI (which includes machine learning and deep learning) capabilities, storage, data processing, analytics, automation, and more. These are services that cloud vendors have tailored for your business’s needs with the expertise and depth to run them at enterprise scale.

Improved regulatory compliance and security

A unified platform lets organizations draw on best-of-breed cloud security and regulatory compliance technologies, implementing Zero Trust security and compliance across all environments in a consistent way.

Overall business acceleration

This includes shorter product development cycles; accelerated innovation and time-to-market; faster response to customer feedback; faster delivery of applications closer to the client (like edge ecommerce); and faster integration with partners or third parties to deliver new products and services.

If you want cloud without compromise, without a doubt in our minds, almost every medium to large organization requires a hybrid cloud strategy that starts with capabilities and not destinations (let that fall into place afterward) and folks...that’s what this book is all about.

Cloudy Skies Are the Best Forecast Ever

A cherished bottle of Rémy Martin Louis XIII Cognac is blended from 1,200 different cognacs aged up to 100 years, with each bottle representing the career achievements of generational cellar masters. Parmigiano-Reggiano Stravecchione’s (the Italians refer to it as the “King of Cheese”) complex flavor and texture are a result of no less than four years of aging. Bruce Springsteen spent an unbelievable six months editing the lyrics of his famous song “Born to Run.”

Oh, the sung praises of slow mastery—great things take time. But while cognac, cheese, and songs can be *slowly* aged into masterpieces, technology years are like dog years: things change, and change happens quickly. While the romanticism of slow change is valuable for some things, today’s businesses and institutions need more speed to market, more flexibility, and nimbleness to respond to changes in the economy, buyer behavior, supply chains, geopolitical realities, climate change, and more. If you had to prioritize a list of all the things you could do to deliver a better product or service in the most optimized fashion, infusing technology into all parts of your business should be at the top of the list.

The changes we’ve seen in the past few years are rewriting the basic behaviors and assumptions we’ve had about IT. Technology has the very real effect of redefinition. Businesses must rethink how they create and deliver value, how they compete, how they transact, and ultimately how the business itself works. Technology provides a strong basis for business and institutional innovation by creating a lingua franca for data, applications, and workflows where an ecosystem of ideas from customers, suppliers, and partners can be brought together.

In the US, the Black Friday shopping bonanza¹ is a great example of how technology changes IT practices. Many retailers still impose a blackout period against pushing any technology changes during those dates because they don't want to risk anything that could impact profitability in the final days of the year. Then microservices came along, which allowed a few retailers on the leading edge to change those behaviors. For example, Amazon's website isn't a monolithic page of logic; it's an eloquently orchestrated set of microservices that come together and work harmoniously to form a real application. Jeff Bezos, former Amazon CEO, once famously said, "Build services or look for a job somewhere else." This is exactly why we tell clients their goal isn't to build applications, but rather to compose them! Amazon's web pages are hundreds (if not thousands) of small services that have single jobs. Building software this way completely redefined how that organization creates and delivers value, how it works, how it competes, and how it transacts.

With technology, almost everything about a business—its logic, purpose, and differentiation—can be rendered in code, making digital innovation the most powerful way to drive transformation and change (or to pivot during a crisis). The emergence of public clouds has, until recently, led the debate on one of the fastest ways to prepare a business for the future; however, a closer examination suggests that most workloads (about 80%) have yet to move. Most companies have only taken on lifting and shifting what they could "as is" to the cloud, or building "greenfield" (net new or born on the cloud) apps on public clouds.

As it turns out, the mission-critical workloads that run large businesses and institutions often span extensive IT estates that include traditional on-premises investments and multiple clouds—private, public, and even on edge devices. Another inhibitor to the realization of cloud value is that almost every client we've ever talked to has invested with multiple cloud vendors and technologies. Add to this business operations that span geographic locations, each with unique government and regulatory requirements, and you've got a jumble of experiential and implemented cloud solutions without interoperability. The end result? The inadvertent creation of a hybrid cloud without a strategic approach, leading to messy, high-friction barriers to innovation and realization of your cloud aspirations. Our recommendation? Embrace the diversity by building a purposeful hybrid cloud strategy (we'll tell you how throughout this book). If you're familiar with Hadoop, its fate was sealed because too many business leaders thought they could build a single analytics strategy around it. The cloud is the same: a single cloud strategy just isn't realistic thinking.

1 The nickname for the Friday following US Thanksgiving Day where stores offer deep discounts for the Christmas shopping rush; many refer to this event and the days from it up until Christmas as "make or break" in terms of sales for the current year.

Thrivers, Divers, and New Arrivers

Without question, the events of 2020 were an awakening for many. In 2021, the effects of the COVID-19 fallout continue to impact nations the world over, changing commerce and lifestyles in ways that would have seemed unthinkable just a short while ago. The only certain fact in these uncertain times is that “things” will never be the same, even with a vaccine. Whatever the future will be dubbed—“back to normal,” “the new normal,” or our preference “the new abnormal”—leaders must reckon with a new set of challenges that span the gamut from societal reform, to global health, to new ways of conducting business and education. One area of upheaval that has often been treated as an afterthought but has been profoundly changed by the events of these last few years: the way business is (and will be) done.

The COVID-19 pandemic has been an eye opener on many fronts. From a business point of view, most companies have come to realize (COVID aside) they are simply not modernized (prepared) for a digital economy. Each of us has had experiences that could fuel stories to be told. We’ve heard early anecdotes of people attempting to order toilet paper online from a big-box store, then walking by a toilet paper endcap in a brick-and-mortar store because they didn’t want to panic buy, only to find out that their online order could not be fulfilled and was cancelled!

Another big-box store had an outage and could not process transactions; yet another familiar household name left customers in a web chat queue for hours, waiting for answers to basic questions such as order status or finding open locations. Some people waited for hours on both the phone and in chat queues to see which would resolve the problem (or get a response) faster, and discovered that these two channels made the business seem like different companies—so much for your omnichannel support (insert your experience here...). There’s no coincidence that all of these big-name stores weren’t born online. They (and us as customers) figured out quickly that their transformation journeys weren’t nearly on the well-trodden path that they thought they were. The truth is that they realized that their hard-won “digital transformation” wasn’t anywhere near as effective as they thought.

One thing is certain: large or small, those companies that didn’t have a true pulse on their digital transformation before most certainly do now. They’ve seen customer satisfaction drop to nonexistent levels because of a lack of digitized self-service resolution and overall order fulfillment frustrations (can you say, “negative Net Promoter Score”—don’t snicker, it’s a real possible score). For many, it took months to set up curbside pickup; many vendors’ online SKU catalogs *still* don’t match what’s in-store; search engines “found” merchandise that was out-of-stock, but didn’t tell the customer until checkout (just when you thought you finally found what you needed); and many recommendation engines surfaced highly sought-after items in stock-out positions to go along with your in-stock purchases...frustrating.

These are all examples of a value chain that ignored user centricity and collapsed upon itself—supply chain disruption that was carelessly surfaced to clients in need at the most inopportune time. These companies were all guilty of not knowing what they already could have known—an enterprise amnesia if you will. It’s perfectly fine to be sold out of a hot item; it’s quite another to take a user right through to checkout, and then surface an out-of-stock position or direct customers to a brick-and-mortar store based on inventory data that’s more stale than the “Last Day for Sale” rack at the seediest donut shop you’ve even been in. But was this avoidable? Yes!

These actions (or perhaps better said, inactions) cost sales, eroded customer loyalty, diluted trust, and opened the front doors with a “Welcome to our Home—Take What you Want” mat for modernized businesses to steal market share—and so some of them did. COVID-19 has caused many businesses large and small to fail; you just need to read the headlines to see what happened. While it’s nearly impossible to understate the devastating impact of COVID-19 on global commerce and people’s well-being, there is something few are speaking about: the harsh toll inflicted on businesses who’ve been talking (for a long time) about things like resilience and agility but didn’t make them true priorities (some might call it “walk the talk”). Contrast this with those who prioritized these values and were well prepared to seize unexpected opportunities for growth. These companies became digitally touchless and fully (and consistent) omni-channel; it didn’t matter if you were on a mobile app or website, phone or chatbot: your interactions had the same capabilities in either medium. That isn’t to say there wasn’t a downside or pain for even the most prepared companies; however, it’s fair to note that if most companies had a six-month warning of what was coming, they would have done a lot of things differently and prepared in different ways. That’s the point.

During the unprecedented challenges of COVID-19, many companies were divers, while some were thrivers. Consider two famous branded US-based craft and bulk food stores. Both enabled their omni-channel presence with backend business operations to support a seamless curbside pickup experience within days of closing their retail stores (the thrivers). In contrast, because of outdated monolithic ordering systems and static infrastructure, a number of large grocery stores and retailers took weeks or months to get their order fulfillment processes in line with the current reality—despite having far more IT resources and budget. Others found their way as new providers as they rose to the occasion: the new arrivers. For example, think about the growth of internet-connected fitness class apps like DownDog (provides a studio-like yoga experience in the comfort of your home) or fitness equipment companies like Ergatta (rowing) or Tonal (pulley weight training with a large screen assistant), and so on. These new arrivers differentiate from those that thrived (like Peloton). As you can see, across all industry, some thrived, some arrived, but many dived.

In another instance, a sporting goods store couldn't process orders (or they took minutes to process) leading to a record number of abandoned online shopping baskets. Desperate customers ran to what were once virtually unknown vendors who could swiftly answer questions or tell them their order was processed in a timely manner (and where an order confirmed meant you were actually getting the item, which wasn't a guarantee with the divers)—a warm welcome to the new arrivers!

There are far more bad stories than good—many more divers than thrivers or arrivers—and the consequences of shaken consumer confidence continues to outlive the pandemic. The one undeniable advantage shared by arrivers and thrivers alike was a well-thought-out renovation and innovation framework. As we move into emerging-from-pandemic discussions with clients, it's clear that their digital modernization plans just got accelerated by five years as digital-first becomes even more critical to their future.

Business Vaccination: The Arriver's Guide

As the world deploys COVID-19 relief in the form of vaccination, a business “vaccination” has long already existed—it's the activation of a well-proven innovation and renovation strategy (we'll give you a framework for understanding renovation and innovation at the end of [Chapter 2](#)). That's a bold statement, and the point isn't to make light of the seriousness of COVID-19 from a personal health perspective, but to seriously consider the components of an agenda that has the net effect of moving the mindset (and the business for that matter) away from “survive” and into “thrive and arrive.”

[Figure 1-1](#) shows a well-trodden and proven path to renovate and innovate your IT estates. We'll discuss each of the steps in the sections that follow.

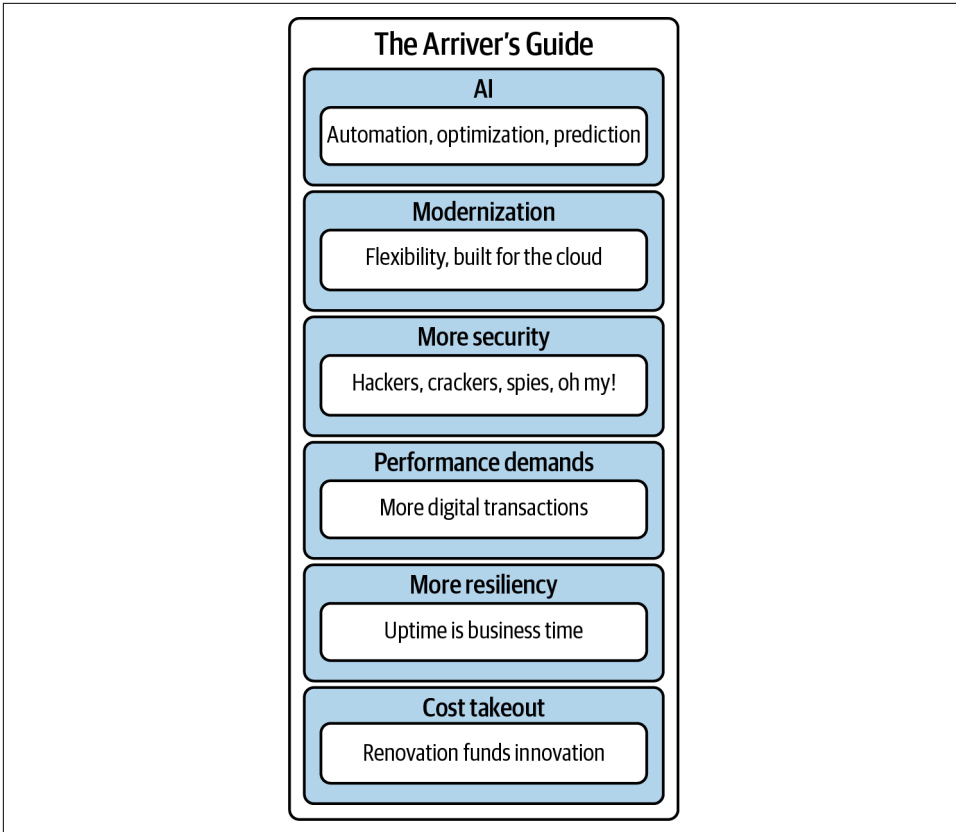


Figure 1-1. The Arriver's Guide

Cost Takeout

Undoubtedly, COVID-19 has hit many bottom lines and that will surely mean (to many) reduced budgets and sensitivities to investments that don't have direct impact on profit. One cost-savings strategy is cloud computing. As it turns out, many who think they'll just flip their apps to a public cloud often come up short on cost savings (some spend more—read [“The Cost of Cloud, a Trillion Dollar Paradox”](#)) or never fully realize the cloud's benefits; this is why experts agree that about 80% of applications haven't become “cloud-ified” (we'll talk about this later in the book). Folks that come up short are often tying the word cloud to a destination and not a capability.

An additional cost-takeout winner will be consolidation, which can impact hardware and software costs (never underestimate the ability for good hardware to reduce software core licenses). The use of cloud native technologies like containers and Kubernetes are huge, as consolidation and virtualization play into the hands of any cost-savings strategy. This all enables business in an economically savvy and

concentrated fashion. This also frees resources (computational and financial) that can be funneled toward other critical areas that make up an infrastructure agenda—such as resiliency, security, and performance. Bottom line: cost-savings opportunities will come with other considerations that need to be well understood and planned, and those that think the cost savings opportunity is strategically but a simple click away will be as successful as those business leaders who think AI is magic.

Resiliency

This matters more than ever before: in the new “abnormal,” consumer behaviors of buying, selling, and socializing have been drastically altered. Even after populations have been vaccinated en masse, long-term buying habits, underwriting car insurance in a hybrid workplace environment (this hybrid is a destination), banking (and more) will be permanently changed. Consider the effects of a potential future COVID-19 flare up: the storefront you offer clients for transactions has to keep on running; your contactless payment method must work (in some places you weren’t even allowed to take cash for purchases). These solutions need to be in place before the next potential challenge arises. In other words, getting caught on your heels again will not be an option. You should ensure you’re familiar with key performance indicators (KPIs), such as mean time to repair (MTTR) and mean time between failure (MTBF), recovery point objectives (RPOs), and recovery time objectives (RTOs), among others. In plain speak, these KPIs provide answers to questions like: “How long can you typically go without an outage?”, “How often will an outage be expected as a function of time?”, “How much data can you stand losing?”, and “How fast do you need to get back up and running?” You’ll need to know the answers to these questions like the back of your hand.

Performance

The shift to more online procurement and contracting means more performance demands on the infrastructure. Think about panic buying. While much fun can be made of toilet paper hoarders amidst lockdowns and supply chain breakdowns, think about critical drug therapies and interventions. For many, medical prescriptions became a legitimate panic and so began a race to pharmacies to fill them. Pharmaceutical systems had to keep running, even under the unprecedented transaction levels they experienced in the first weeks of the COVID-19 pandemic (not just from individuals buying their medicine, but from pharmacists needing to pull medical records, allergy information, cross-drug interactions, warnings, and more). There were pharmacies during this challenge that didn’t miss a beat, and those that sadly got beat up. It’s also worth a moment of thought to consider how the accelerated movement to contactless payment methods helped to mitigate the spread of disease. Those payment systems not only needed to work (resiliency) but they needed to respond quickly (performance)—before the COVID-19 crisis began, if point-of-sale systems

went down, accepting cash only was merely a frustration. As COVID-19 infections became more and more prevalent, these systems going down literally meant “no sale.”

Security

As more and more businesses harden their online presence in response to growing customer demands, security is paramount. Evidence suggests that hackers used the COVID pandemic as an opportunity to up their attack frequencies—**Forbes** noted a 238% rise in attacks on banks and a 600% increase on cloud servers between January 2020 and April 2020! We expect to see concepts such as Zero Trust, Security Information and Event Management (SIEM), and Trusted Execution Environments (TEEs) move from “great to talk about” to real plans to do it. The more and more people transact online, the more risk we face with fraud and identity theft. The more data that’s in-flight or at-rest, the more it needs to be protected (hint: today, the world isn’t doing the job well enough). In fact, contactless pay providers like Apple Pay, PayPal, or Android Pay (among others) should see a surge because credit card information doesn’t have to land or flow through the vendor, thereby lowering the risk of credit card details falling into the wrong hands. What about the protection of data at rest? We’re betting (because we were shocked at how much we didn’t know until we knew) most don’t fully appreciate how much of a role even storage considerations play in a truly hardened cyber-resilient strategy.

Now consider the fact that the amount of data breaches and data heists for crypto ransoms has never been more plentiful (2021 is proving this in monthly intervals) and dangerous (a disproportionate number of data ransom schemes are mounting up against healthcare facilities—and now think about COVID).

Fact: corporate boards everywhere are asking all kinds of security questions and the job market is thriving (last we checked, we saw well over 200,000 Information Security jobs). This means that if your answer to the question “Where did the hacker go with our data?” begins cheekily with “He ransomware,” that won’t be cute or funny to anyone. This suggests that companies (now more than ever) need to align, protect, and manage threats to their ecosystem (both on-premises and off-premises)—and COVID-19 has made it readily apparent just who is (and who isn’t) ready to offer those assurances to their customers.

Modernization

Modernization is a must-have mindset for both thrivers and arrivers. Flexibility will be a difference maker—and flexibility leads you to the cloud. The term *hybrid multi-cloud* (a mix of multiple cloud vendors and cloud technologies on-premises and in public cloud providers) is a hot topic these days because its very name embodies flexibility, and this is a space you’ve got to know and focus on. The emerging space of distributed cloud (the same cloud technology across multiple cloud destinations,

delivered by technologies like IBM Cloud Satellite, Amazon Output, and Google Anthos) is becoming a hot topic as companies examine the management and skills costs associated with multiple cloud vendors. Whatever the hybrid cloud genre (multicloud, distributed, mix of on-prem and public, or all of them), dynamic (metered) pricing models for consumption of resources is today's marketplace trend. That's a cloud capability. Infrastructure that's flexible in capacity to scale up (or down) in a utility-like fashion at the most granular levels—down to the minute. That's a cloud capability. A service catalog to self-provision modern development environments or applications to accelerate workflow. That's a cloud capability. We could go on (and we will).

But there are right and wrong ways to go about building a cloud strategy. To do it right, we've developed a mantra for this book: "Cloud is a capability, not a destination." What does that mean? If you think of the cloud as a destination, you'll be thinking about AWS, or Azure, or Google, or IBM. And you'll be tempted to unify behind one of them. That's not how the cloud era is playing out for individuals or companies. Think about your personal computing infrastructure. If you have an Apple phone, tablet, or laptop, you're probably using iCloud for something (like backing up your contacts). If you watch movies on Netflix, you're using Netflix's cloud providers (yes, they run on two different clouds that must work together seamlessly to deliver you new episodes of *Grey's Anatomy*). Same for Spotify. And if you use Gmail, you're in Google's cloud.

Businesses are no different. A company's cloud journey usually starts with a few pilot projects in different departments, often because no one wants to wait for IT to approve new hardware: perhaps it's easier to train your "playing around" AI model using Google Collab's free GPU resources versus going to the "Department of No!" (Finance) to get some GPUs. By the time the C-suite starts thinking about a "cloud strategy," the company is already on multiple clouds. It's already multicloud. (This is classic "Shadow IT": you see it in choice of databases, cloud platforms, and the lot.)

But multicloud itself is a dead end if there's no effort to provide a uniform programming and operational interface to those clouds. You shouldn't have to care about where your data is located or where your software runs. That's why the "cloud" isn't a destination. If it is, you'll end up with a fight between marketing doing BI on AWS, finance doing business planning on IBM, and R&D doing AI on GCP. These efforts all need to collaborate. Hybrid clouds are all about integrating multiple cloud providers and in some cases, creating a single unified interface to them (distributed cloud)—and, for that matter, to your own on-premises data and applications. That's where the value of the cloud lies: in the flexibility of not having to worry about where your data is, or where your code is running. That's what it means to say, "Cloud is a capability."

According to McKinsey (and many others) 80% of enterprises are choosing to work in a hybrid multicloud environment, now and in the future. Tying these value statements to a destination does nothing but cheat the enterprise.



Most cloud strategies have been focused on building new applications on the cloud (they are called *greenfield* apps) or a lift-and-shift of existing applications to the public cloud. We refer to this cloud strategy as “Cloud Chapter 1” (an epoch in the journey to cloud, not an actual chapter in this book). We think the hybrid cloud—and its ability to capture the true value of its capabilities—will be the next chapter in the cloud storyline and thus we often refer to it as “Cloud Chapter 2” (the next epoch of the cloud journey). Think of it as getting deeper into the cloud story, where the characters, the plot, and immersion thickens and provides more value.

If you’re having a conversation about modernization, bringing the right apps and services up to par with containers, orchestration, and microservices-based architectures should be among your highest priorities. You should definitely be investigating Kubernetes (K8s). K8s platforms such as Red Hat OpenShift Container Platform (OCP) are becoming the new “operating system.” Open Container Initiative (OCI)–compliant storage containers, enterprise-ready Kubernetes orchestration of those containers, and automation via Ansible and Terraform are the essential pillars for creating an agile IT foundation. (Don’t worry if those words don’t mean anything to you yet; we’ll dig into them throughout this book, but understand them as the technologies that make “Chapter 2” of the cloud possible.) If you build containerized applications to the open standard OCI governance structure, those containerized applications can be provisioned anywhere (on-premises or in the public cloud), regardless of the cloud vendor. Modernizing applications and services on containers deployed with K8s orchestration is one of the best strategies that you can invest in. It doesn’t matter whether your applications are solely apps born on the cloud (people refer to these as cloud native; they were built with modern approaches like microservices and containerized from the start), legacy apps that run your business, or a mish-mash of them all (which is more likely the case). This is a winning strategy.

It’s been said that basketball is a game where a single player can take a team to a title; however, in soccer, it’s your weakest link that can keep you from winning anything. With that in mind, remember that the orchestration platform (K8s) always emulates the ethos of the infrastructure. Was the infrastructure built for resiliency and fast recovery? Was it built to scale? Was it built securely right down to the virtualization level and for Confidential Computing? This all matters; these are all good questions to ask. The modernization journey is a soccer game, not a basketball game.

AI

Can there be a tech-minded book written without the word AI these days? We think not. Yes, it's hyped, and the world tends to overhype what's possible in the next two years. But we can promise you that it often underestimates the profound changes brought about by the technologies that stick around for the next five to ten years. We think that in the future "AI" won't stand for Artificial Intelligence, but rather Ambient Intelligence. Why the word "ambient"? Think of ambient lighting; when done correctly, you don't really notice that it's there, but it's doing its job. AI will serve a similar role in our day-to-day lives and jobs: it will be everywhere, and become just a natural part of our environment. We will stop thinking of it as strange and different.

To us, the opportunities of AI can be summed up as: automation, optimization, and prediction. AI will drive costs down and client engagement up. Without question, successful businesses will unlock the power of data with AI—according to [Forbes](#), up to 73% of data goes unused in most organizations—that's why your AI needs an IA (information architecture). What's more, automation will be unavoidable; some reports suggest that enterprises can use automation to reclaim 120+ billion hours per year spent on low-value work. As companies move from defining their AI progress via algorithm counts in the dozens (at best) to the thousands, discussions will move well beyond how fast and accurate you can train your AI. We will be talking about inferencing speeds (scoring), lifecycle management (the moment you publish your AI algorithm is the moment it's out of date), sourcing data, explainability, bias, and more. Despite being a cloud book, we're going to give you a skills hotlist that any successful enterprise adopting AI needs to master: language, automation, and trust. Cloud is going to be the conduit for great AI...so these themes go hand in hand.

So Why Are Cloudy Skies the Best Forecast Ever?

From golf birdies to bankers, free drops to rain drops, highways to back roads, cloud technology affects them all (and all parts in between). Hybrid cloud is the next major shift in the evolution of IT...think about it, when any new IT architecture emerges and spreads, it has the potential to change the world and the concept of hybrid cloud (which will eventually just be called "cloud") will completely change the way renovators renovate and innovators innovate.

We believe we're at a key inflection point on the continuum of human history and innovation. Our world is set to pivot from a world of automation where humans are supported by technology to a data-rich ambient intelligent world where the technology is supported by humans. To us, this pending shift means that the largest wave of business transformation architecture is just ahead, and it'll be driven by three major shifts:

1. The modernization of critical workloads to build scalable applications at speed.
2. The adoption of Kubernetes to orchestrate those applications across any environment, no matter the vendor or location of the compute runtime.
3. This will all compound to serve as a springboard for the growing use of operational AI and edge applications to create data-driven insights that shape business outcomes.

As you go through this book, we think it'll be obvious that only a hybrid cloud architecture can provide a consistent, standards-based approach to development, security, and the operational hygiene that'll be required. It is a smarter open architecture that allows for workload portability, orchestration, and management across multiple environments. We won't be able to stress it enough in this book: get into the cloud as capability mindset (as opposed to destination) and you'll be a leader of an organization that simply does better.