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Azure

# Designed to Disrupt:

Reimagine your apps and  
transform your industry

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# Foreword

As you read this, a great tectonic shift is occurring in business, a grand transformation that is powered by exponential increases in computing capability. Not that long ago—maybe a few decades—computers, limited by processor speed, memory size, and storage capacity, found utility principally in automating previously manual tasks, such as maintaining the general ledger, keeping track of customer contact information, and tracking parts through the supply chain. These are all very valuable and, indeed, essential activities in any business, but in many ways companies have been, until very recently, simply doing what they used to do, just faster.

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Today, however, many claim we stand in the midst of the Fourth Industrial Revolution, a time of great change when business is not simply moving faster, but changing, transforming, irrevocably. With the near-limitless power of computing now available in the cloud, and with cloud-based advanced services like machine learning and deep data analytics available at commodity prices, businesses can, at a stroke, revolutionize the way they do business.

Companies are finding new ways to attract new customers, to interact with them and to build new forms of trust and intimacy, no matter where they are in the world. With connectivity reaching to every device the consumer owns and every machine on the factory floor, entirely new business models are emerging that leave the old models in the dust. With unprecedented efficiency, businesses can now adapt and respond to market changes not in months or weeks, but in seconds. All these help companies access new markets, drive new revenue streams, and boost top-line growth.

Moreover, the digital supply chain streamlines relationships with partners, and cloud technology has strengthened employee engagement and focus.

It truly is a revolution. And as in all previous revolutions, those who embrace new approaches may reap great rewards; those who continue to play by the old rules will, in all likelihood, be left behind. In our first chapter, we'll talk about why many believe we are experiencing the Fourth Industrial Revolution, and what its significance is to you and to your business. We'll also show what it means to IT, which is evolving from being a service bureau to becoming a true partner to the business. This change has tremendous implications for not only the IT organization but also for the Chief Information Officer.

Now, it's often been said that if you can imagine it, somewhere, somehow, someone can make it come true. As the three authors of this book, we deeply believe that. Each of us, as well as many of our colleagues, spends time with companies analyzing their business processes and business models,

showing them how cloud technologies can completely change them for the better. We'll spend the second part of our book showing some of the results of those exercises. In each case, in periods of time ranging from just a few days to no more than a few weeks, we and our customers constructed truly remarkable and in some cases mind-blowing new applications that could completely transform their business. We're very much hoping to inspire you with these real-life stories.

In Part 3, we'll talk about the process of envisioning. How do you start the process of reimagining what it is your business does and drive it to fruition? Understanding your business first before focusing on technology;

bringing the right people; building what we call "situational fluency," that is, quickly becoming expert in the business problem and business process; and then showing how technology can enhance and perhaps revolutionize the business: these are what the concluding chapters—based on real-world experiences, as is the whole book—will do.

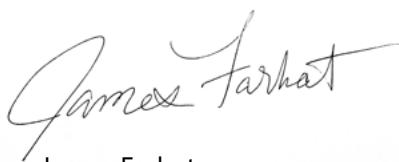
It has become evident in our discussions that while the cloud clearly represents a paradigm shift in the technology of computing, it has also spurred a radical transformation in the business of business itself. Our goal is to help you identify how you can lead your business through this new era of opportunity, and come out on top.



Eduardo Kassner



Barry Briggs



James Farhat

# Who should read this book?

If you're a CIO, CTO, strategy officer, an IT decision maker, or a leader in your business, we wrote this book for you. For CIOs and IT leaders, we want to inspire you with exciting new possibilities for you to add value to your business in this book. For business leaders, we will show you how to innovate in your business today using the cloud and driving transformation through IT.

Not so long ago, corporate IT departments were large organizations that seemed to many on the outside to be too slow, too expensive, and filled with highly technical staffers whose job had little directly to do with the success of the business. Of course, upgrading operating systems, applying patches and doing backups of critical system databases were all important, critical even, but hardly contributed to the bottom line. How many times have we seen the 80/20 rule of thumb of IT invoked, that 80% of the IT budget goes to maintenance, leaving only a pittance for innovation? (And 80/20 is considered good in some quarters!)

A central theme of this book is that the cloud changes everything about IT, and for that matter, everything about how

technology works for the business, for many of these non-value-add functions are handled by the cloud provider as part of your subscription. Data centers, servers, storage and networks are maintained in the cloud, at a stroke reducing this huge cost from the organization; and depending on the level to which you take advantage of the cloud, the cloud provider will also maintain operating systems and other software such as databases and integration brokers.

Freed from the burdens of these low-value operational functions, CIOs and business leaders can refocus their investments on driving incremental and, for that matter, transformational business value from IT.

But how?

That's really the core purpose of our book: to show you what transformational change looks like and then to outline how you too can achieve it—and you can.

We believe that this is an historic time for business, and in particular, for the relationship between business and technology. If you want to learn what kinds of transformation are possible, and how to implement them, this is the book for you.

## Part I.

# The Grand Transformation

# Chapter 1.

# The cloud computing revolution

Two and a half centuries ago, a Scotsman named James Watt, working at the University of Glasgow, was asked to repair a clumsy, inefficient device that used steam to pump water from coal mines. Watt soon realized that the machine could be made much more powerful if it had a separate "condenser" to keep the steam hot, rather than reheating it after each cycle of its cylinder.

With this realization James Watt built the first modern steam engine.

Today, most credit Watt and his invention with beginning the First Industrial Revolution, which ultimately resulted in the steam-powered locomotive, the first machine tools, automated manufacturing, and many other technical innovations. As a result of the First Industrial Revolution, standards of living rose, wages for all economic classes grew; perhaps for the first time in history, a middle class began to emerge, and a new spirit of entrepreneurialism was born.

The effects, in short, were nothing less than profound: with Watt's invention, the world changed forever.

Subsequent industrial revolutions had equally far-reaching effects. At the turn of the twentieth century, the development of

turbines and the invention of alternating current brought electricity to the factory floor and to consumers, spurring tremendous economic growth. And a half century later, the first computers automated tedious, time-consuming manual tasks like balancing general ledgers, printing reports and so on.

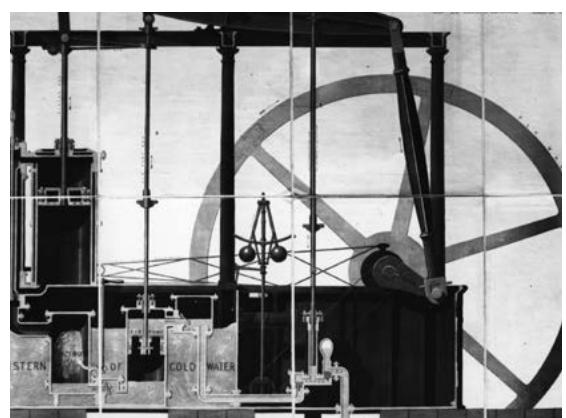


Figure 1-1 A replica of James Watt's steam engine

A recent article in *Foreign Affairs* noted that we are in the midst of the Fourth Industrial Revolution, a transformation comparable in magnitude to those when steam power first mechanized production, when the mass

availability of electricity enabled the assembly line, and when early computing automated manual tasks. Today we are seeing the spread of digital technology affect and change every aspect of business.

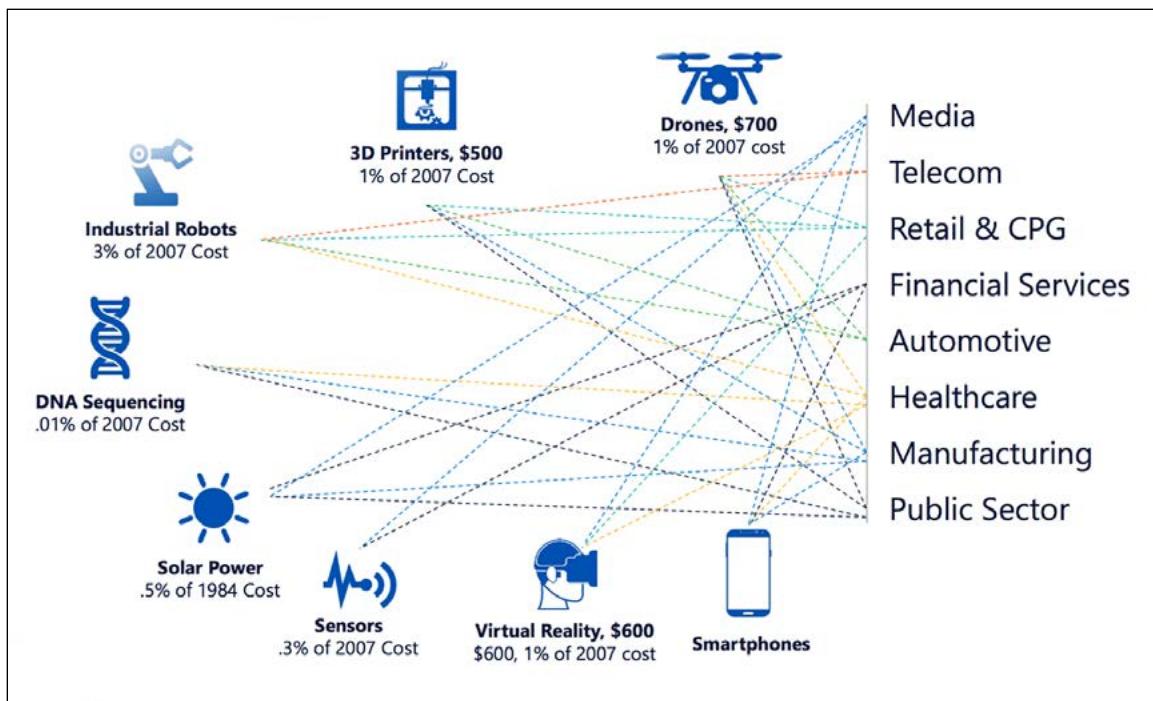


Figure 1-2 Transformative technology is affordable

Evidence of this change is everywhere, as shown in the illustration above:

- In 2000, sequencing human DNA cost \$2.7 billion. By 2014, the cost had been reduced to under \$1,000, and several companies will provide DNA analytic services today for under \$100.
- Drones in 2007 cost tens or hundreds of thousands of dollars, and were rare; commonplace today, they can be purchased for a few hundred dollars.
- Industrial robots priced at half a million dollars just a decade ago average less than a tenth of that today.

- The time for many digital-centric companies—Google (8 years); Facebook (6); Uber (4); Snapchat (2)—to reach a \$1 billion valuation is far less than the typical Fortune 500 company (20 years).

And so on. A great change is occurring, bringing better products to market faster, carefully tuned to customers' needs and desires, all enabled by digital technologies.

So, what does that mean in dollars and cents?

The coin (just to extend the metaphor) has two sides: on one, a recent World Economic Forum study notes that over half (52%) of the companies in the Fortune 500 in 2000 have disappeared, and that the majority of today's companies "will not exist in a meaningful

way 10 to 15 years from now."

But that same study also claims that digital transformation for just ten industries will unlock \$100 trillion for business and society by 2025.

Digitization is changing everything.

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## The end of business computing as we knew it

What is driving this paradigm shift in business? After all, we've had digital technologies in our data centers for decades.

In fact, even through the 1990s we did not see the full realization of the potential of computing, for two primary reasons. First, the technical capabilities of computers, in terms of speed, memory, networking and storage, in those days were limited. Secondly, and more importantly, until recently most IT departments took a "walled garden" approach to computing, meaning of course that businesses believed it necessary to have their own data centers with their own computing equipment in-house.

This approach had many economic disadvantages. For one, implementing a new business model or function typically implied purchasing new computing equipment, a process that in practice often took weeks or months. Getting the requisite approvals, procuring hardware, finding space in the data center, purchasing software licenses: all these were time-consuming, tedious, and expensive.

Worse, as these new systems came online, executives realized that many, if not most, of the processors in their costly data centers

were seriously underutilized: as often as not, CPU utilizations held steady in the single digits. CFOs in particular were dismayed: they were actually getting much less for their money than they expected.

This realization led to a trend toward virtualization, where a single powerful computer could host many operating systems and applications—in effect, consolidation. Virtualization did result in cost savings, but they were limited; in fact much of the cost savings were eaten away by the infrastructure and effort required to manage it, leaving little money with which to focus on application development and innovation.

Beginning in the early 2000s a new style of computing began to emerge, one in which compute capability was no longer seen as something that required massive capital expenditures, but rather one that should be regarded as a dial tone-like service, where individuals and companies paid for the capacity they used. A provocative article by Nicholas Carr in the Harvard Business Review in 2003 entitled "IT Doesn't Matter" suggested that much of contemporary IT provided little competitive advantage:

*Indeed, it is hard to imagine a more perfect commodity than a byte of data—endlessly and perfectly reproducible at virtually no cost. The near-infinite scalability of many IT functions, when combined with technical standardization, dooms most proprietary applications to economic obsolescence.*

*Why write your own application for word processing or e-mail or, for that matter, supply-chain management, when you can buy a ready-made, state-of-the-art application for a fraction of the cost? But it's not just the software that is replicable. Because most business activities and processes have come to be embedded in software, they become replicable, too. When companies buy a generic application, they buy a generic process as well. Both the cost savings and the interoperability benefits make the sacrifice of distinctiveness unavoidable.*

*The arrival of the Internet has accelerated the commoditization of IT by providing a perfect delivery channel for generic applications. More and more, companies will fulfill their IT requirements simply by purchasing fee-based “Web services” from third parties—similar to the way they currently buy electric power or telecommunications services.*

In many ways, Carr's article, which at the time stirred a storm of controversy, signaled the beginning of the cloud revolution, in turn leading to the Fourth Industrial Revolution. By now, a decade and a half later, most companies recognize that it makes little financial sense to host their own email services (for example), when it is a simple matter to sign up for subscription-based services (such as Microsoft's Office 365) that provide the same level of reliability, resilience, and security for a fraction of the cost.

Yet, as we shall argue throughout this book, IT does matter. What is changing, in many very profound ways, is what IT is used for. As we shall see, the arrival of cloud computing and other new technologies allows technology organizations to directly contribute to top- and bottom-line value, to become true partners to the business, instead of wasting time on non-value-add functions.

# What do we mean by “cloud”?

Many factors have converged to drive the momentum behind what we now term the “public cloud.” Cloud providers, recognizing the historical inefficiencies that so many organizations faced, began a decade or so ago to create massive data centers, holding tens or even hundreds of thousands of servers, and making that capability available on a rental basis. Economies of scale, and custom-designed servers, drove savings in hardware, which the cloud providers pass on to their customers. Rapid expansion in internet technologies, including cheap, high-bandwidth networking, pervasive security, and ever-improving performance, have led many to drastically scale back their own “on-premises” computing investments in favor of the cloud.

We have come to call cloud computing “hyperscale,” meaning that no matter how much computing capacity or storage you need, it’s available for you to rent, and when you no longer need it, you no longer have to pay for it. For cloud providers like Microsoft to be able to guarantee the benefits of hyperscale computing, it meant a massive buildout of data centers totaling in the millions of servers.

And for customers, hyperscale computing means a new economic model, one in which computing, in a way very similar to how utilities like telephone and electric power operate, is offered “as a service,” in a subscription, pay-as-you-go model.

Initially, IT executives viewed the cloud as a way to cut costs, and that view was certainly correct.

With the rise of widely available commodity “Software-as-a-Service” applications—that is, prepackaged applications available for rent,

typically on a per-seat basis—applications such as email, customer relationship management applications, and collaboration could simply be removed from the company’s data center. Technicians responsible for keeping the email servers up and similar functions could then be reassigned to other higher-value roles.

For custom, or customized applications over which the business wished to retain control, the cloud offered a cheaper way to host them. By “lifting and shifting” these workloads from on-premises data centers to data centers in the cloud, companies found themselves able to shutter whole facilities and cut capital expenses.



Figure 1-3 Microsoft cloud data center in Dublin, Ireland

And by adopting new techniques, such as agile development and “DevOps” methodologies, and in some cases re-architecting applications to better take advantage of the cloud, organizations find themselves able to tune the amount of cloud resources allocated at any given time to their applications, scaling up as demand did (for example, during holiday seasons) and releasing resources back to the cloud when these were no longer needed. The “pay-as-you-go” model, properly managed, can generate considerable savings.

Of course, as we have learned, cloud migration is not simply a technical matter of copying software and data from an on-premises data center to one in the cloud. In fact, it has significant organizational impact, as two of us (Briggs and Kassner) discuss in our companion volume, *Enterprise Cloud Strategy* (2nd Edition). Finance teams need to be able to model, manage and monitor the new cost structures of subscription-based IT. Information security teams need to satisfy themselves that sensitive data is safe in the cloud. Risk management and legal teams need to look at regulatory compliance and understand what the cloud provider can be responsible for and what their applications must still provide. Development and test

teams will operate differently. And IT teams will have to prioritize which applications move to the cloud first, which follow, and which ones must, for various reasons, stay on-premises.



Figure 1-4 Microsoft cloud data center, in Quincy, Washington

## The cloud becomes mainstream

There is little doubt that the cloud has by now become mainstream. According to the market intelligence firm International Data Corporation, spending on the public cloud will reach \$122.5 billion in 2017, with a remarkable compound annual growth rate (CAGR) of some 21.5% between now and 2020, when the market size will surpass \$200 billion.

In our conversations with organizations—of all sizes—we have noted a sea change in attitudes toward the cloud: only a few years ago, we talked about “if” they were going to move to the cloud. Today, there are two highly interrelated questions: “when” and “how.”

Clearly, the answer to “when” is now, to receive the immediate cost advantages we have described above. We describe the “how”—including where to start, how to prioritize, and how to prepare your organization—in our book *Enterprise Cloud Strategy*.

Over time, the majority of computing will relocate to the cloud. In a sense, the cloud will contain thousands of virtual data centers, securely running servers, networks, applications, and storage that used to be the domain of the corporate data center.

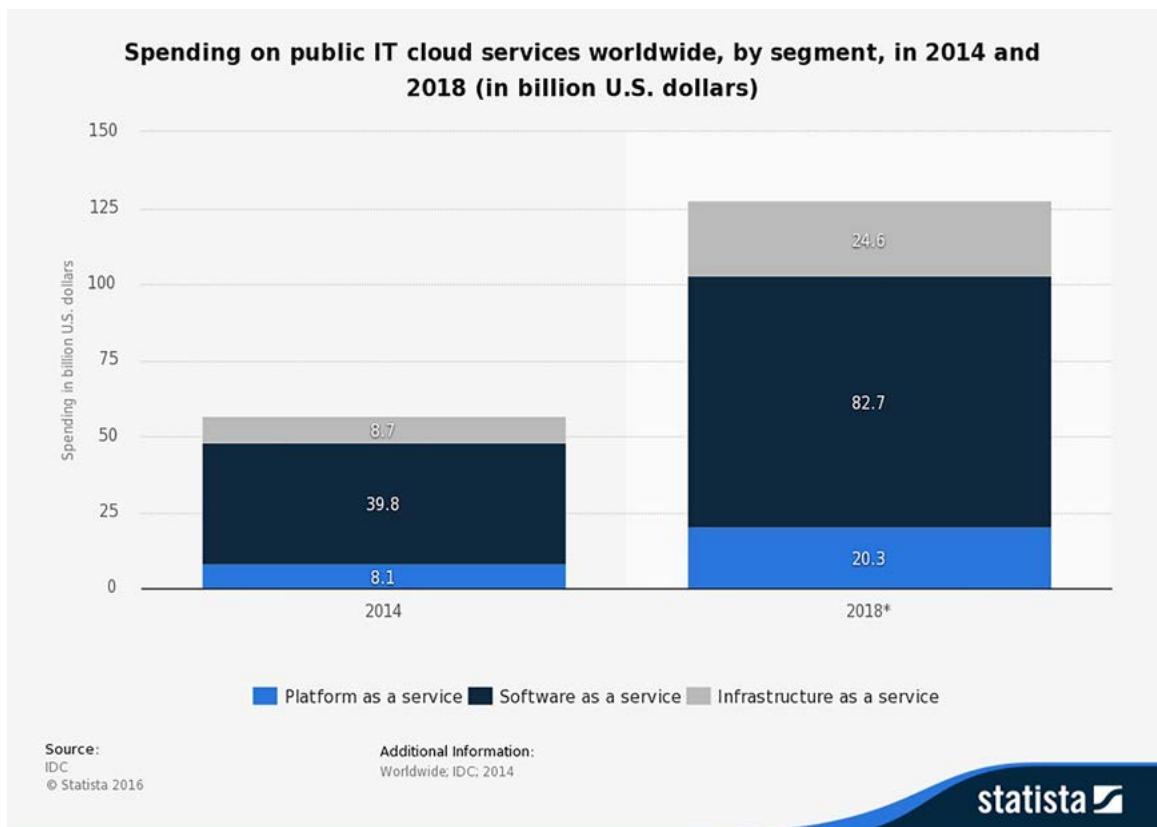


Figure 1-5 Spending on public IT cloud services worldwide, accessed through Statista

## The fourth industrial revolution

But here is an important point, in fact one of the most critical in this book: none of this is truly transformative. Hosting servers and applications in a different location may save money, but it does not *change your business*.

But a truly remarkable phenomenon is occurring whose impact and scope are well beyond the simple cost savings of a migration. Businesses are discovering that because of the reach and connectivity of cloud services, they can transform how they

conduct their businesses; indeed, they can turn their decades-old business models *on their heads* to increase revenues, efficiencies, and customer satisfaction and to access entirely new markets.

A recent survey of over a thousand CEOs worldwide, conducted by PricewaterhouseCoopers, shows that 86% believe digital technologies will transform their business *more than any other change*.

As consumers, we see the effects all around us. We can order a ride from our mobile phone. Drones will soon be able to deliver packages. Artificial intelligence applications can predict when a part will require replacement, and soon may be able to drive your car on your behalf. For next to nothing, we can communicate with anyone in the world, anytime.

Companies are seeing equally revolutionary effects and are changing business models to take advantage of them. By being able to monitor digitally enabled devices, be they hydraulic presses, jet engines, pipelines—you name it—in real time, manufacturers can guarantee uptime; and as a consequence, they can switch from a capital-sales model to a subscription model, where the customer gets higher uptime and the manufacturer gets a recurring revenue stream—a clear win-win.

New technologies enable a global workforce to work better together. Conferencing technologies such as Skype are inexpensive, and with new automatic translation capabilities it is increasingly likely that companies will be able to tap talent no matter where they live, no matter what language they speak.

With capacious storage, and with new kinds of analytics, companies can know their customers better, predict their buying habits more accurately, and provide more finely tuned offers. As a consequence they will be better able to predict quarterly revenue farther in advance, and plan appropriately.

How has the cloud, directly and indirectly, made all this possible?

- First, because of the cost reductions of no longer having to maintain on-premises data centers, businesses can shift those resources to more value-add activities, instead of doing backups or applying patches.

- Second, the cloud has global reach, enabling you to reach more customers. Your applications can run 24x7 anywhere on the planet with an internet connection, serving people anywhere, anytime. And with the cloud, it's easy to reach users on any device.
- Third, the hyperscale cloud offers, for all intents and purposes, limitless compute and storage on demand. No longer do organizations need to wait on procurement cycles, available space in data centers and so forth to try something new. In fact, because of the on-demand nature of the cloud, experimentation is far easier—and cheaper.
- Fourth, applications in the cloud can rapidly take advantage of cloud services such as big data, analytics, machine learning, and visualization, to easily—but dramatically—expand the capabilities and functionalities of their applications: opening new markets, reaching new customers, predicting future trends, monitoring their products in real time, and so on.
- Finally, cloud capabilities are increasingly being offered in ways that enable complete applications to be built with a minimum of code, and sometimes no code at all being written by the application developer. These “snap-together” parts (called “serverless” components) represent a breakthrough in developer productivity and rapid creation and modification of applications. This of course means that new business models—and, for that matter, ideas—can be tried quickly, without tremendous investment. If they work, they receive more investment; if they fail, they can be easily discarded.

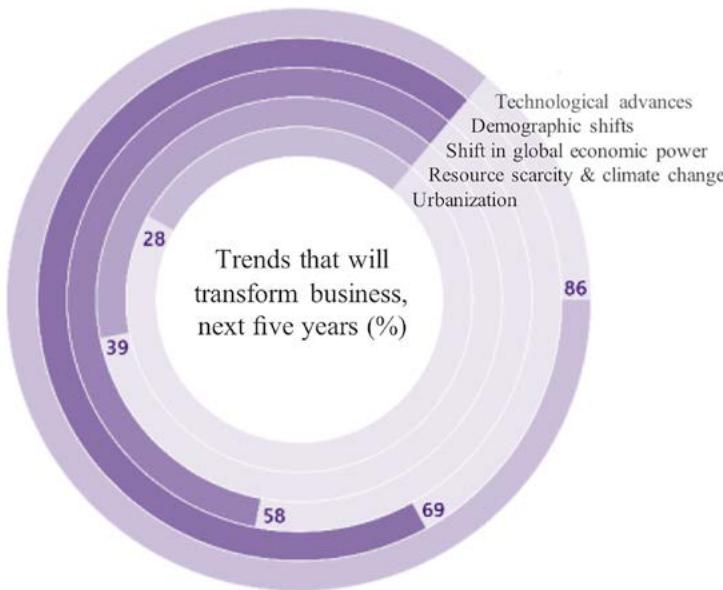


Figure 1.5 Trends that will transform business, according to CEOs

As we shall see, these profound changes impact nearly every aspect of life, just as Watt's steam engine a few centuries ago.

But how do we make these changes?

In the next chapter, we'll try to convey two important points. The first involves showing some very transformative applications that use *existing data and applications* that, when linked to cloud services, enable some truly remarkable functionality.

The second point we'll make is that doing this is not hard. In many of the cases we'll show, creating the prototypes or proofs of concept took days, and never more than a month. This is a far cry from the days when requirements documents were written and signed off, various other specifications created, meetings held and functionality debated, before a line of code was written—a cycle often taking months.

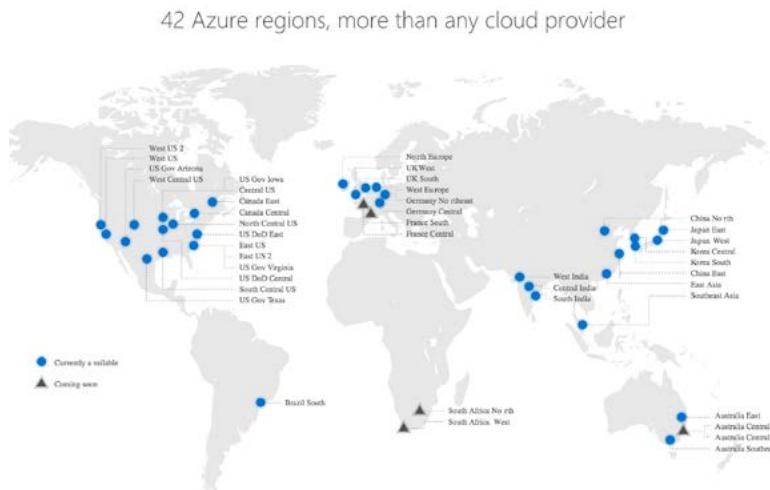


Figure 1.6 Microsoft cloud data centers, mid-2017  
(frequently updated: check at [Azure.com](http://Azure.com))

# Chapter 2.

# Transforming your business: What and how

As we argued in the previous chapter, we believe we are in the early stages of the Fourth Industrial Revolution, a time of both technical and business upheaval that will dramatically change how businesses operate—and how we live. Indeed, as we write this, the business world is buzzing with the phrase “digital transformation,” the engine behind this grand shift. What is it? And what does it mean for you?

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Broadly stated, the term means that by embracing the possibilities afforded by modern computing technology, in particular the cloud, businesses are discovering that there are new opportunities for market expansion, for new revenue streams, for new ways to communicate with customers and suppliers, and, most interestingly, for entirely new business models. In this chapter, we’ll discuss how you can think about this great change with your business.

To be clear, however, any such change begins not with the technology, but with your business itself. How does your business work today, and what are your goals going forward? What is on the horizon that is likely to forever change your industry, to *disrupt* it? If you can clearly articulate these, then you’re well positioned to think about how technology can accelerate achieving your goals—or perhaps unlock some new goals.

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## Optimization and disruption

Companies are always changing; it is, as the old saw goes, the only thing in business that is constant. Business conditions evolve, new technologies arise, economies ebb and flow,

regulatory and compliance environments become more or less restrictive.

How you respond to these changes—especially in today’s hypercompetitive world—is critical.

We can think about change in two ways: *optimization* and *disruption*, which are both valid ways to react to the need for change. Optimization, in the digital era, means applying technology to existing business processes and models to make them run more efficiently, enable them to address an expanding market, and so on. Every company that hires full-time employees must have a process to onboard them: to

find them offices, provide them with PCs and credentials to enable them to access applications and data, set up payroll, and so on. By using modern software-as-a-service human resources (HR) applications, along with automated network provisioning applications, and so on, this process can be greatly sped up. In Part II, we'll show how Microsoft itself optimized its HR processes with cloud technology.

## Optimizing your business processes

It's an old axiom of business school that every business is nothing more and nothing less than a collection of processes, and—certainly from a particular perspective—it's true. At the highest level, every organization

in a business—HR, sales, marketing, customer support, engineering—manages key business processes that take the company from one state to another. Here's a sample of what those processes could look like:

Business Unit	Process name	Description	Successful result
HR	Hire to retain	Onboarding new employees, training, performance reviews, rewards	High-performing, stable workforce
Logistics	Order to cash	Receipt of order, inventory management, supply chain, shipping, accounts receivable	Profitable business
Sales and marketing	Lead to customer	Marketing and sales pipeline, from product awareness to lead generation to CRM-based prospect management	New and retained customers
Engineering	Idea to shelf	Engineering processes from prototyping, development, test, manufacturing process development	New products
Customer support	Issue to resolution	Call center processes from call receipt to knowledge management, escalation processes, issue resolution	Satisfied customers
Procurement	Procure to pay	Purchasing authorization, vendor selection, accounts payable, payments	Prompt and predictable receipt of supplies

You'll see we've used an "x to y" pattern to name our processes. This is to connote that every process has a start and a result, showing the motivation for the process in the first place.

To achieve success in executing these processes requires the close cooperation of business and IT. In the next chapter, we'll show how IT responds to the challenge of digital transformation by supporting company-wide business processes with a set of targeted *service offerings* supporting the processes.

Now, it's unlikely that the essence of your businesses will radically change: every for-profit business, for example, will always have an order-to-cash process. But the details, the speed, the level of automation, the insight, and the scale will all change, generating very different results. So when thinking about the processes in your company, or the processes you own, consider:

- What specific KPIs do you want to improve, and why?
- Where are there bottlenecks, perhaps caused by manual interventions? Where are opportunities to cut costs or skip steps?

- How could you change the manner in which you conduct business with your customers, knowing that you can 24x7 monitor the operation of your products in their hands?
- Where can advanced data analysis or machine learning help you predict results or suggest adjustments to maximize those results?
- Knowing that everyone is competing for the best talent, how would you improve and streamline your human resources processes so that every employee can feel fully engaged and committed to the company's success?
- What external data—such as weather data or demographics—could you use to optimize your processes and accurately predict outcomes?
- Where can you extend your processes to take advantage of new customers, new suppliers, and new employees elsewhere in the world, by using cloud-based collaboration, or by expanding to cloud data centers located elsewhere?

## Disrupting your business models

Certainly using the cloud to optimize your business and re-engineer business processes will show positive results. However, consider: what new business models will be possible in five years with new technology?

Indeed, will your business *even exist in its current form in five years?*

Recall that Blockbuster, the videotape rental service, was made obsolete by Netflix's DVD mailing service. Less well known is that as Netflix transformed to a streaming service,

its revenue dipped by nearly 80% before it became a leader in the streaming-media segment.

BMW and Daimler, the giant automakers, are well known for applying state-of-the-art technology to their design and manufacturing processes. Both, however, have also recognized the power of new technology—and a changing demographic. With "cars-as-a-service," customers can use credit cards to "borrow" cars for short trips, generating an entirely new revenue stream.

How do you know when to optimize and when to disrupt? We'll talk more about how to think about this later, but, briefly, the answer involves understanding your business in depth, as well as the competitive climate

and emerging technological opportunities. In Part III we'll provide a framework for you to take this information and distill it in such a way that you can make a decision.

## Start with your digital business strategy

Not that long ago, creating a change strategy began with the "why." Perhaps new competition had appeared, or new markets

had opened that required you to rethink how you conduct business.

### Why-what-how

After exhaustive analysis of the reasoning, another analysis examining what new business capabilities had to be added or modified was performed, followed, finally, by implementation. It all seems sensible enough: the analysis

minimized risk and created reasonable expectations of cost, required resources, and timelines. At each point decision-makers could add input and adjust the trajectory of the project. We call it the "why-what-how" model.

WHY	WHAT	HOW
<b>Reason to change</b>	What will change	How to change

This "waterfall" approach usually involved a series of analyses and documents—a market requirements document, a design specification, a functional specification, for example—each of which underwent time-consuming review and approval processes before any technology was touched. In some ways, this was reasonable: the risk of

anything new had to be understood and reduced before any costly technology was procured and deployed.

Increasingly, companies no longer have the time for such exhaustive (and exhausting) preparatory work.

Fortunately, in the digital world, there is a better model.

## What-how-why

In today's cloud environment—unlike in the past—it's inexpensive and fast to run experiments, to quickly connect your data to cloud services, to connect services to each other, and to build new solutions. There's no need to cost out what a new rack or two of servers for your data center might cost, to negotiate licenses with your software vendor, or to bring on a large development team. The risk of experimentation in the cloud is very low.

Time and again in our experience, we have seen teams come together for hackathons—group prototyping exercises—and discover not only that there's cloud technology that can help with the problem at hand but also that what they have created applies to a broad range of business problems and applications throughout their businesses.

We call this the "what-how-why" approach: we start with a very specific problem, say, how to get better insights from a body of data or how to better personalize responses to customers. As we experiment with the technology, we learn its applicability to a given problem, we realize it, and we find related or adjacent technologies can be applied elsewhere—perhaps even transforming how the business runs. Rather than deciding *a priori* where the value of a given solution will lie, we discover along the way many points at which technology can add value.

In some ways the "what-how-why" approach is less predictable: it's not always clear at the beginning what benefits will be gained from this initial development. The very positive tradeoff, however, is that it often yields exponential results that can be applied in many areas, quickly.

WHAT	HOW	WHY
<b>Problem to solve</b>	How to build it	Through experimentation, discover more benefits

## Using the cloud to transform your business

We'll provide lots of examples in Part II showing how business in concert with IT, and sometimes working in close partnership with the cloud vendors themselves, can show huge value by building quick prototypes and proofs of concept following the what-how-why approach. And in Part III we'll give

you some tools that you can use to drive transformation in your organization.

But just as business is undergoing a transformation, so too the IT department must itself evolve. In the next chapter, we'll describe both why and how this change is effected.

# Chapter 3.

# Transforming IT

All of what we have seen thus far obviously has huge implications for the management of technology, once exclusively the domain of the IT organization. With an increasingly tech-savvy generation joining the ranks of companies not just in IT but everywhere, and with the ease and simplicity of cloud computing, applications can spring up from anywhere. The role of IT itself will change as data center operations are transferred to cloud providers, and rote operations like patching and system software updates are no longer managed by IT. IT professionals and IT organizations as a whole must then pivot to become true partners to and enablers of the business.

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With the arrival of cloud computing, many pundits have announced the imminent demise of corporate IT. Nothing could be further from the truth: IT is as necessary as ever. However, as we hinted at in the last chapter, the roles of both IT professionals and of the IT organization as a whole change. IT must become a true partner to the business.

This has been the aspiration of CIOs and IT leaders for a very long time; the time, however, has come.

How can we do that? In this chapter we'll spend a bit of time describing pre-cloud IT operating models, and then talk about how these must change—and how they can—to meet the demands of the cloud era.

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## The pre-cloud architecture of IT

Today, most “traditional” IT organizations consist of a matrix of business and technical functions, following one of two or three accepted models. In one, which we will call the “federated” model, IT is organized by the business units it supports, so there is a

Finance IT organization, a Human Resources IT organization, a Legal IT organization, and so forth. Each of these may or may not report up to a single CIO, but the advantages and disadvantages have over the years become clear.

Typically, each business unit IT organization (IT-BU) contains relationship managers, who work with their business partners to envision future capabilities and create design specifications for enhancements to existing applications, or spec out new applications to support new initiatives. Within the engineering team are coders who program, testers, project managers, people to manage user acceptance testing (UAT), and a host of other staff. An operations team manages deployments, backups, and infrastructure

such as networks, servers, and storage.

Each IT-BU has direct accountability to its business and competes with the others for resources and talent. Often, functions such as operations are duplicated across the different IT-BUs, and as often as not, they implement different procedures for doing the same functions—everything from change management to disaster recovery. As new functions are added—such as online presences—new organizations are created, often independent of the other IT-BUs.



Figure 3-1. Federated IT

The illustration above shows a hypothetical IT organization structured in this manner. Each IT-BU has its own set of functions; each is a mini-IT organization in its own right. The Online Business Unit, formed to handle internet-based marketing and transactions, and mandated to “move quickly,” in this case created its own IT functions entirely separate from those in the corporate organization (organization relative sizes not necessarily to scale).

This independence can be not only inefficient and costly, it can be the cause of legal or compliance issues. For example, many of the

IT-BUs must, because of their mission, manage customer data. But will each handle security around Personally Identifiable Information in consistent and rigorous ways? Will there be a common source of core information about customers, such as a single “source of truth” for the customer’s contact information?

Recognizing these issues, IT executives reorganize around a more centralized model. Here, there is a single pool of account managers for all business units, a single engineering team, and a single operations unit. This model tends to drive much more

consistency around how IT is actually performed and allows for company-wide adoption of common IT management frameworks such as ITIL and COBIT. Moreover, by having a single talent pool for each capability, it gives employees better growth paths than they would have in the federated model.

Nevertheless, the creation of these entirely

separate cultures drives even more inefficiency. Since these are often large groups, issue escalations go further up the management chain than, frankly, they need to. Moreover, accountabilities to the business that IT serves tends to get muddled in these large organizations. Is it any wonder, indeed, that businesses find IT organizations structured like this to be opaque?



Figure 3-2 Centralized IT

Unsurprisingly, many have commented that IT organizational structures tend to follow a “pendulum” model, alternating between centralized and federated. Our view, however, is that cloud computing breaks the pendulum forever.

There are variations on these models, of course. Some companies have aligned their IT units around not business units but business processes, such that there is an “order-to-cash” organization and others for “prospect-to-customer,” “idea-to-product,” and so on.

This model more closely aligns IT to what the business actually does; and, in theory at least, consolidates related IT functions under single roofs. However, it can suffer from the same problems as the federated model.

In all of these models, the implementation of business capabilities through IT involves a complex set of handoffs, which inevitably incur huge inefficiencies, cost overruns, and schedule issues.

# The cloud as catalyst for IT change

The arrival of cloud computing and many technologies that it enables, such as mobile, social computing, big data, and artificial intelligence technologies, catalyze how many think of IT and should cause executives to think how they can best align their IT investment with the new opportunities the cloud provides.

As we saw in the previous chapter, the easy availability of a wide variety of new technologies that can quickly multiply the reach and function of corporate applications changes everything about IT. Businesses in the internet age will no longer be satisfied with waiting 90 or 180 days or more for new features to come online.

Indeed, as we have seen, many companies deploy several times a day; indeed, some of the largest internet properties deploy literally *thousands* of times each day. This implies a very different approach to IT than traditional models.

In this world, the ubiquitous use of the “waterfall” methodology must decline in favor of a more rapid, more responsive approach called “agile.” In agile development, small teams work in concert with their users, pumping out frequent incremental releases and getting feedback at each step, the goal being that at the end, the product meets the needs of the users—and nobody is surprised.

Now, many have said that the agile methodology will replace waterfall. We don’t

entirely believe that. For certain applications that have high regulatory or compliance requirements, it remains vital to have a detailed specification and controls in place to ensure that laws and rules are complied with.

Many now distinguish between so-called “systems of record” and “systems of engagement.” Systems of record—ERP systems, financials, and so on—are applications that must be correct and all data in them must be consistent, as they are the basis for reporting results, demonstrating compliance, and so on.

Systems of engagement are applications that engage your customers, your partners, and your employees. They are designed to provide a pleasing and valuable experience for the user. Email, social networking, and marketing applications are systems of engagement.

While the data in systems of record changes frequently, the applications change slowly. In the ever-growing world of systems of engagement, applications and data change fast—sometimes, as we have seen, very fast.

With the cloud, agility is the key word. Because of the demand for efficiency and rapidity these inefficient processes must change, and therefore the roles must change as well. Everyone must become at once fluent in both the business as well as the underlying technology.

# Evolving role of the Chief Information Officer

The CIO thus becomes a full partner to the business; no longer does the CIO manage non-value-add staff, but rather the entire department is directly contributing to the bottom line. CIOs are judged on their ability to be transformative in a whole new way.

Perhaps no statement more typifies the changing role of the CIO than this one from Jim Dubois, formerly Microsoft's CIO:

*I and my teams used to be measured on whether or not we delivered applications—like marketing applications—on time. Today we are measured on the quality and volume of the leads my applications generate.*

In other words, Microsoft IT is now measured upon business results, not by application delivery or other technical milestones. This is a very profound change.

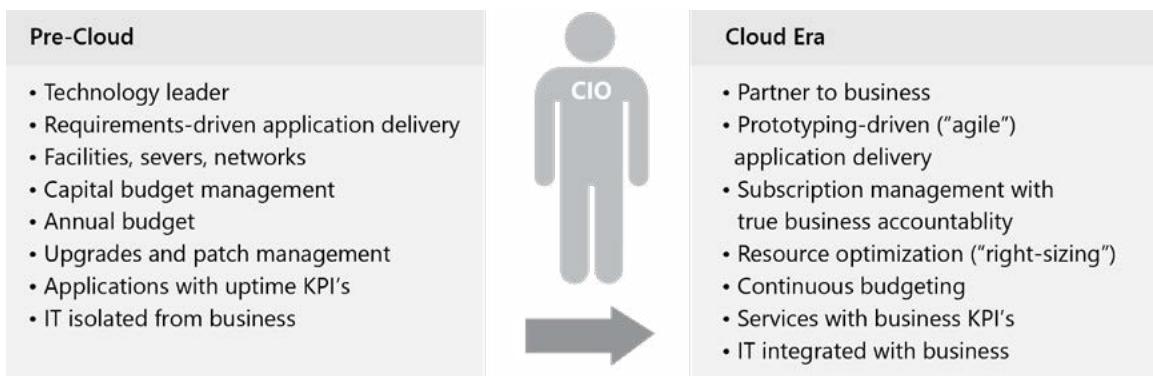


Figure 3-3. Evolving role of the CIO

Years ago, the CIO was known as a technology leader, whose teams kept the servers running, managed networks, helped users reset their passwords, did backups, and built and maintained applications. Moreover, because every CIO had to manage data centers, a huge capital investment in most cases, budgeting, financial management and planning were year-long activities requiring detailed research, preparation, and review by senior management. Because of the waterfall-style requirements model, the distinct nature of business account managers, development, test and operations, and because of long lead times to procure hardware, image it, and install it in the data center, applications could take months or even years from time of conception to deployment.

As we've stressed, the cloud changes—indeed, breaks—much of that model. CIOs are freed from having to run large-scale data centers and from buying hardware in bulk, and they no longer have to manage the accounting complexities of depreciation and tax credits.

Instead, CIOs working with their business partners can set up cloud subscriptions in such a way that provides businesses with clear visibility into their IT costs (as we describe in Enterprise Cloud Strategy). Adding compute and/or storage resources in times of heavy demand is simple and straightforward, as is releasing them when no longer needed.

Most importantly, as we showed through the many examples in Chapter 2, technical teams

can work closely with businesses to develop new functionalities that drive new revenue streams. Long-lead application development

is being replaced by prototyping and experimentation, and in this way the lines between the business and IT, once thick, are blurring.

## Service-oriented IT

As Jim noted above, it's no longer about application delivery or uptime, but rather about the results the business achieves because of its partnership with IT. Just as the cloud provides computing resources as a service to customers, so now IT can provide business services—as measured by business results—to its internal customers.

And that is what Microsoft IT has done, now supporting some 15 service lines, shown in

the chart below. Notice that for each service, results are measured in terms of business KPIs. As Jim noted above, it's no longer about technical measurements: It's about how IT supports the business.

The intention is to match up the company's digital transformation goals with each of the service offerings and to do so where IT can also get some operational efficiencies. By making this as simple as possible IT can give



Figure 3-4 Microsoft IT service lines

each IT customer what it needs in ways that are predictable, fast, and reflect their needs and the way they want to work.

The service line model helps IT leaders change their own perceptions of their roles, less as technology leaders and more as business leaders working in IT. As such they can then consider IT investment relative to all business investment.

One of the most common benchmarks of IT spend is the IT budget as a percentage of company operating expense. Typically, that number is around 5%, give or take a point or two.

Here is the point: prioritizing all the IT investments still only affects about 5% of operating expenses. However, if the IT and business align-

ment is done well, that is, done with close partnership between the business and IT, that alignment could help prioritize some of that 95% of the spend outside of IT in the business.

For example, as Jim noted, the marketing service offering aims to deliver end-to-end services for our consumer and commercial marketing actions around the world. A desired business outcome is to generate qualified leads that can be acted upon by the adjacent service offering: Sales. While there are other business outcomes to work toward, the qualified lead is a successful business outcome that both IT and marketing leaders can work toward achieving.

## Evolving roles of IT professionals

Within the IT organization, roles of individual professionals are also changing to reflect the new order of things. This evolution will take time, but there is already a divide opening between traditional IT roles and those with a strategic focus for the cloud era.

The diagram below shows that traditional, commoditized roles will remain for a time, to be gradually replaced with higher-value ones. Those in the functions on the right will be more closely aligned to the business and provide direct value to it, with a natural

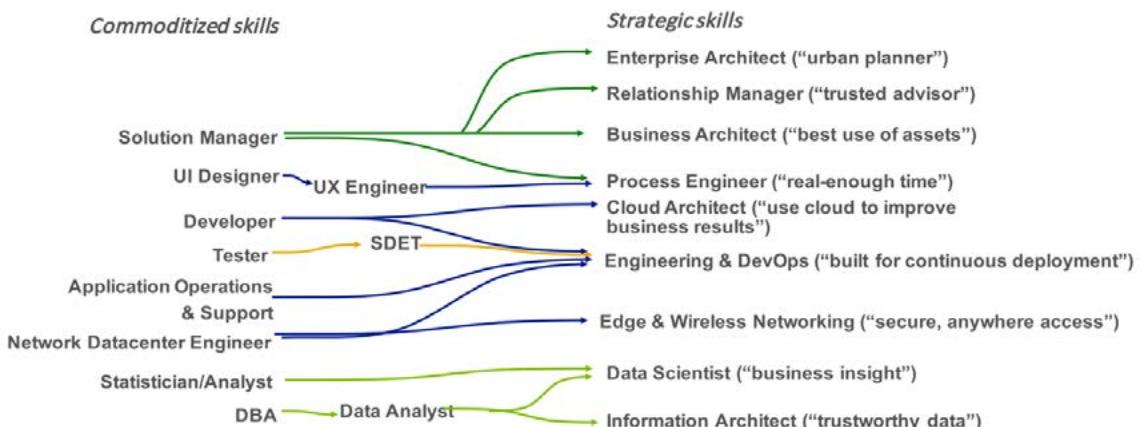


Figure 3-5 Evolving roles in IT

progression from the left side to the right. Let's take a moment to review what these new roles are, and how they provide value to the organization.

- *Many organizations* have an *enterprise architecture* team, and their goals are to look across the entire ecosystem of IT—the applications it manages, the data—to ensure that the company is using them most efficiently; that is, getting the most for their money. EAs ensure that across the IT ecosystem duplication of function is minimized and that new capabilities are built in the most cost-effective way possible.

Many of the traditional tools of EA, grounded in traditional models, will evolve as the cycle time of new functionality quickens, and EA—like all of the functions—will need a strong focus on innovation as well. But their core function, as “urban planners” of the IT ecosystem, becomes even more important.

- *Relationship managers* ensure, through high-bandwidth conversations, that the business has full visibility to IT and vice versa, and that the needs of the business are being accurately reflected and realized in applications.
- For each business function there are usually any number of separate applications. The *business architect* ensures that the *business* gets the most from each application and that taken as a whole the applications fulfill the needs of the business.

- *Process engineers* examine the end-to-end business processes and ensure they are optimally designed and are functioning with maximum efficiency.
- The *cloud architect*, working closely with other architects and with the DevOps teams, picks the most optimal cloud components—be they complete SaaS applications or specific services in the cloud—and designs applications, or systems of applications, that fulfill a business need.
- The *Engineering* and *DevOps* teams (often the same group) build applications, and test suites and deployment scripts that enable applications to be built, updated, and deployed continuously to satisfy the need of the business for frequent change to match changing business conditions.
- The *networking and security* teams ensure that communication from the edge—that is, from networked devices on-premises and in the field (such as IoT devices) to and from the cloud—is fast and secure.
- *Data scientists* in IT (and perhaps as well as in the business) examine the masses of data collected, extracting insight and predicting the future.
- And *information architects* ensure that data models across IT align and that the data maintained by IT is trusted and available to applications and people that need it.

## Security, risk and compliance

No discussion of IT in the cloud would be complete without mention of the critical elements of security, risk management, and regulatory compliance, as well as the teams that manage these areas. We covered these topics in detail in Enterprise Cloud Strategy, and we recommend reviewing those sections as you make use of the cloud.

Your Chief Information Security Officer will provide guidelines for how to use cloud resources securely; for example, how to think about different document classifications; how to securely maintain information about your customers in order to maintain their privacy, such as Personally Identifiable Information (PII); what data must be encrypted at-rest and in-flight, and so on.

You'll also need to connect with risk management and compliance professionals to ensure that you stay compliant with relevant laws, regulations and industry standards, such as

the Payment Card Industry Digital Security Standard (PCI-DSS) for accepting credit payments online, the Health Information Portability and Accountability Act laws for safeguarding the privacy of medical information, and the US Federal Risk and Authorization Management Program (FedRAMP), a government-wide program for standardizing security assessments, authorization, and monitoring for cloud services, to name a few.

Your compliance teams will of course need to continuously monitor emerging regulatory initiatives for their impact on your company and its cloud applications. The European Union's General Data Protection Initiative (GDPR), approved by the European Parliament in April 2016, will be enforced in member countries in May of 2018—and organizations not in compliance with its privacy laws will "face heavy fines," according to their website.

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## IT and innovation

Now, you'll notice that nowhere in these roles did we describe a particular role charged with innovation. The reason for that is that *all roles must innovate*. It is incumbent on *everyone in IT—and the business*—to be on the lookout for opportunities to make transformative change happen.

However, digital transformation means, at its core, a bridging of the historical gap between the business and IT. With IT now providing services to the business and being measured on achieving business results, the partnership between the two units grows. As the business innovates—which it must, to survive—so too can IT provide the engine that drives the innovative change.

# Building the business of the future: Start with ideation

The ever-increasing speed of today's business means that much about IT—and business—must change. For CIOs, the good news is that you have the people you need to accomplish this, but accomplish it you must, for in our view those not adapting will be left behind.

Of course, every company is different, and the precise structures and organizations you put in place will differ from others'. What we hope to have shown you, however, is that to institutionalize the innovative thinking leading to the breakthroughs that we're about to present, you'll need to change how you think about technology; to achieve the results that you must in order to compete, you'll need to focus hard on your business processes and then select from the wealth of cloud technology available to improve it.

And the best way to do that is to start with ideation, with experimentation, to build prototypes and proofs of concept that show what is possible, to inspire your teams with possibilities.

In Part II, you'll see many examples of prototyping done by Microsoft teams working in partnership with their customers. In other cases, you'll see examples of digital transformation in production. All of these occurred by customers, sometimes in collaboration with Microsoft teams, sometimes with consulting partners, and sometimes by themselves, reflecting on their existing business processes and then using cloud technology to improve—sometimes dramatically—their function.

We're showing you the results first, before describing in detail the ideation process. Our

not-at-all hidden agenda in approaching our narrative this way is to hopefully inspire you with some remarkable true stories, and then we'll spend the next few chapters telling you how to approach ideation and solutioning.

Now to be clear, in some of these examples the prototypes were then completed by their engineering teams and deployed to production, and others were not deployed; but in all of them, customers' (and our) eyes were opened to whole new possibilities.

It's also important to note that these proofs of concept generally took days, and no longer than weeks, to complete, meaning that in very short order executives could see new capabilities and new business models.

The best way for us to demonstrate this is through example, and on the next few pages you'll read about companies that made great strides in digital transformation.

Several themes will emerge.

- First, *global, high-speed, and inexpensive connectivity* afforded by the ever-expanding internet and by the cloud enables ever-closer contact with customers, partners, and suppliers, reducing friction at every level and enabling real-time decision-making.
- Second, the availability of *nearly infinite computing resources, memory and storage* on demand has released nearly all constraints from software. Applications can scale, seamlessly, as needed to reach a global audience at times of high demand and contract later. Moreover, capacious

quantities of data—about customers, parts, devices, patterns, activity—can be maintained and analyzed for actionable insights never before possible.

- Third, new technologies available only in the cloud, and offered by cloud providers—such as massively scalable Internet of Things applications, specifically designed to monitor and control huge numbers of connected devices ranging from sensors in cars to manufacturing devices to home alarm systems, almost ad infinitum—open new frontiers in digital control and enable new forms of business.
- Next, the rise of artificial intelligence technologies, which leverage the processing and memory power of the cloud already in their nascent state, have spawned new forms of customer interaction and new ways of predicting the future.
- Finally, a perhaps surprising observation: In many of the cases we describe, all the data that was needed for a transformational application or new business model was already there, and the business only needed new ways to analyze, combine, or visualize it.

## Part II.

# Tales of Digital Transformation

# Chapter 4.

# Pillars of transformation

It's easy to dismiss digital transformation as just the next buzzword—but it's happening, right now, in every industry. In the next few chapters, we'll look at how companies have already imagined their digital futures—and have deployed solutions. We'll take a look at the four pillars of digital transformation—**engaging your customers, empowering your employees, optimizing your operations, and transforming your products.** We'll show not only the solutions themselves but also how companies imagined and ideated these new ideas—and how you can, too.

## Transformation is happening in every industry

Everywhere, it seems, the cloud and new technologies are disrupting industries. However, not all industries are embracing

digital technologies ("digitizing") as fast as others. A study by Morgan Stanley shows the differences:

## Morgan Stanley's Digitalization Index

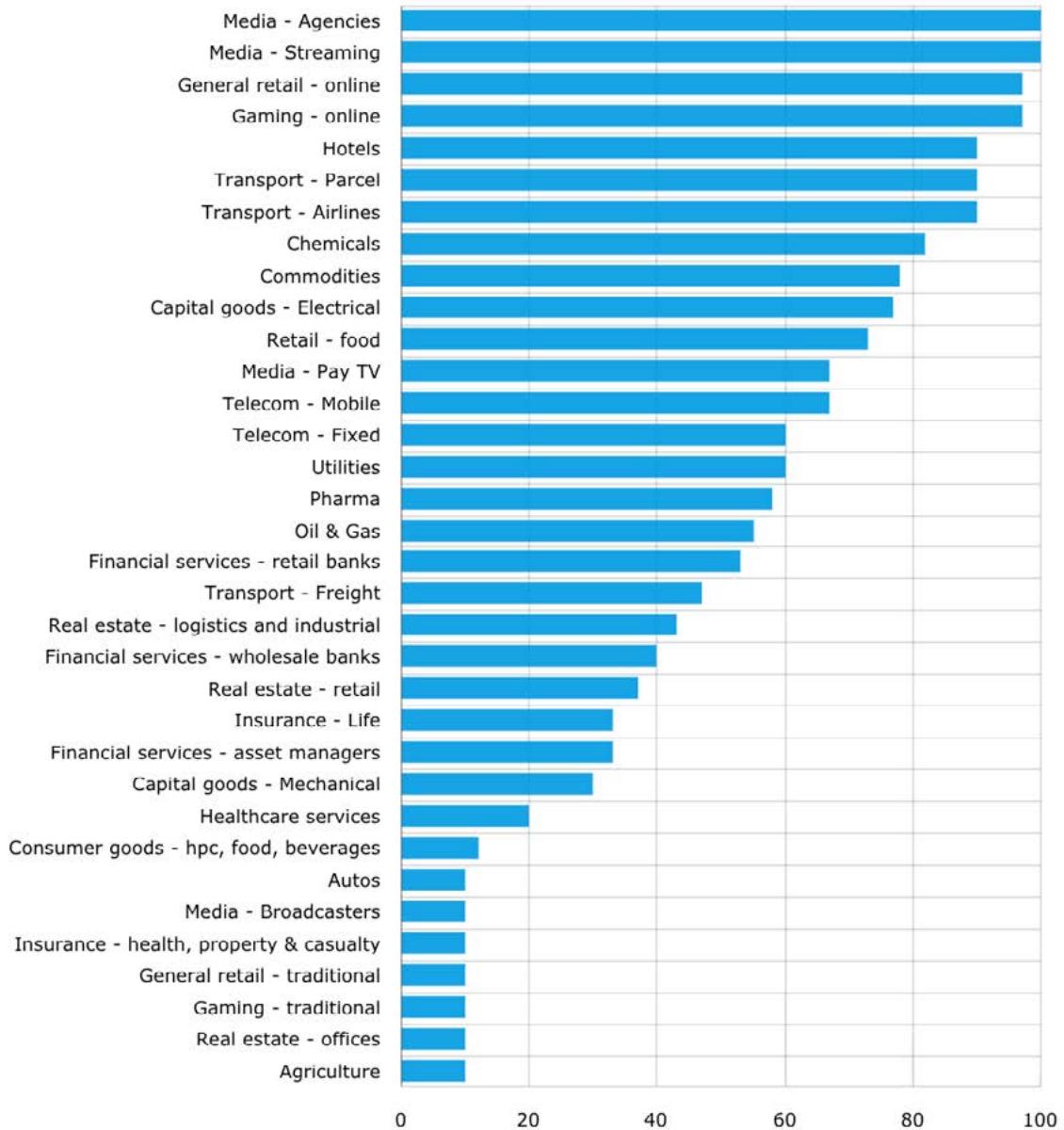


Figure 4-1 Digitization by industry (source: Morgan Stanley Research estimates)

How is your company, and your industry,  
digitizing?

# The pillars of digital transformation

Here is a convenient framework for thinking about digital transformation efforts. In the following chart, you can see that digitization affects very nearly every part of a business, from

how you communicate with your customers to how—and what—products you build, how you use your data, and how you connect with your employees to drive productivity and satisfaction.



Figure 4-2 Pillars of digital transformation

Let's take a look at each of these in more detail.

- *Engage your customers:* You can tailor individual customer experiences by harnessing data and drawing actionable insights. To stand out, you must understand customers as individuals and find new ways of interacting with them.
- *Empower your employees:* You'll be able to help employees achieve more by creating a work environment that's intelligent, flexible, and secure, and creating opportunities for people to collaborate from anywhere, on any device.
- *Optimize your operations:* In today's hypercompetitive world, you'll need to accelerate the responsiveness of your business, improve service levels, and reduce costs with intelligent processes. By coordinating people and assets more efficiently, you can respond to issues in real time—and even preemptively solve them.

• *Transform your products:* Using data as a strategic asset and shifting from hindsight to foresight, you'll be able to differentiate and capture emerging opportunities. The opportunity to embed software and technology directly into products and services is evolving how organizations deliver value.

The next few chapters contain a number of case studies and user stories describing how companies in a wide variety of industries used digital technologies to transform their businesses.

But as important as the new solutions are, we've also talked with many of the individuals who came up with *these solutions*, and in several of our stories we'll show how business people and technical professionals came together and brainstormed, with remarkable results.

# Chapter 5.

# Engage your customers

Maintaining a close relationship with your customers to understand and anticipate their needs, to provide them with what they need, when they need it, has always been at the heart of business. Indeed, customer supply and demand are not only at the heart of business; they are, and have been since the dawn of time, at the heart of civilization.

The earliest writings we have from ancient Mediterranean cultures are not poetry or hymns to the gods, but records of goods sent and received, invoices and payments, and lists of possessions. Commerce gave birth to and drove the growth of civilization.

As cities grew and a merchant class developed, even the most humble shopkeeper knew who his or her customers were, what sorts of goods they were likely to purchase, and when they were likely to purchase them. The astute store owner would instinctively know customers' favorite colors, or birthdays, or when they would purchase something special for their spouses.

We have struggled to maintain that level of intimacy as chain stores, malls, and eventually the internet itself have grown to reach millions of customers. In 1993, Don Peppers and Martha Rogers revolutionized the new emerging discipline of customer relationship management with their seminal book, *The One to One Future*. In it, they argued that with technology, it would be possible to capture customer behavior and preferences and thus electronically drive personalized interactions with customers.



Figure 5-1 Linear B tablet from ancient Greece

The results are obvious, and we've all experienced them: "People who bought this product also liked this product," and "based on your purchase history, we know you'll like this," and so on.

But their book (now iconically referred to as "Peppers and Rogers," rather than by its title) is only the beginning. Business systems now contain far more information than ever before, information that is available

immediately, that can be combined with other information to make useful inferences, and which can be sent across the internet to mobile devices virtually anywhere in the world.

We've found that with a little imagination you can connect to every one of your millions of customers in unique and useful ways—not just upselling them new products but, as we shall see, perhaps helping them out a jam.

## Real Madrid

Few sports attract the passion and sheer number of fans as soccer. The legendary Brazilian soccer player Pelé called it "the beautiful game," and billions around the world would agree.

The estimated 300 million fans of Spanish soccer club Real Madrid, only 3% of whom are actually located in Spain, are no exception. Real Madrid is now the number one sports franchise on the planet, with global revenues of 660 million Euros.

The team's executives wanted to reward

its global fan base with exceptional new experiences. "We wanted to connect with all the people who support Real Madrid in the world," said director General José Ángel Sánchez. "It is critical for us to understand and learn from them, because in the end, the club belongs to them."

Noting that Real Madrid's stadium, with a capacity of more than 81,000 seats, is one of the world's largest, Real Madrid president Florentino Pérez added, "We want to open the biggest stadium in the world—in the digital space."

## 40 days

Microsoft business development architect Jesus Serrano Castro was on vacation when his mobile phone rang. "Come back," he was told, "we have an important project for you."

Rushing back, Serrano learned that he and his team would be paired with counterparts from Real Madrid to design and prototype an entirely new set of experiences for their

fans. Because of a previously arranged executive meeting, they had to be able to demonstrate results in just over a month—in 40 days, to be precise. As Serrano recalls,

*"We had no concrete requirements. We just knew we needed to do something that was a 'wow'."*

## Understand the customer

The first step was to understand Real Madrid's business model and ecosystem. To do this, "we moved into Real Madrid stadium," Serrano explains. His team learned that, like many sports franchises, the majority of revenue came from three sources:

- Stadium revenue (tickets)
- Broadcast rights
- Merchandise

The team recognized that by using digital technologies, it could reach its global audience more effectively. For the 97% of its fans located outside of Spain, with huge pockets in other parts of Europe, North and South America, and in southeast Asia, it was clear that the cloud could help make their matches a global experience, driving greater fan loyalty and boosting revenue.

## Ideation

Having gained an understanding of Real Madrid's business model and processes, the second step was to imagine new, cloud-based virtual experiences that would enhance their business. Real Madrid knew that every fan around the world would love to be in the stadium for the game. But how could they make a virtual experience look and feel like actually being there?

They also knew that every fan in the stadium valued the rich experience that watching at

home provides—statistics, replays, and different camera angles—as well as a more social experience; for example, knowing where his or her friends were seated.

Here is where the project caught a lucky break. In addition to being a Microsoft cloud architect, Serrano is also a talented cartoonist. The team storyboarded the in-stadium and the at-home experiences, creating a comic book to present vignettes of the new business processes to executives. Here's a page from that book:

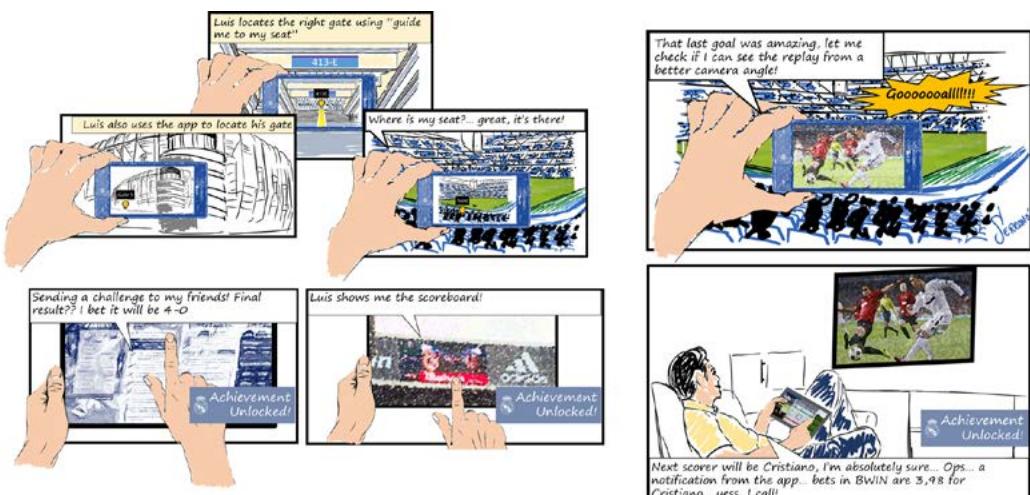


Figure 5-2 Real Madrid storyboards

## Implementation

And here's what it looks like in real life. For the fan in the stadium, the cloud and mobile services provide a premium experience with

an augmented view of the game. Here, the fan is able to see where our user's friends are seated:

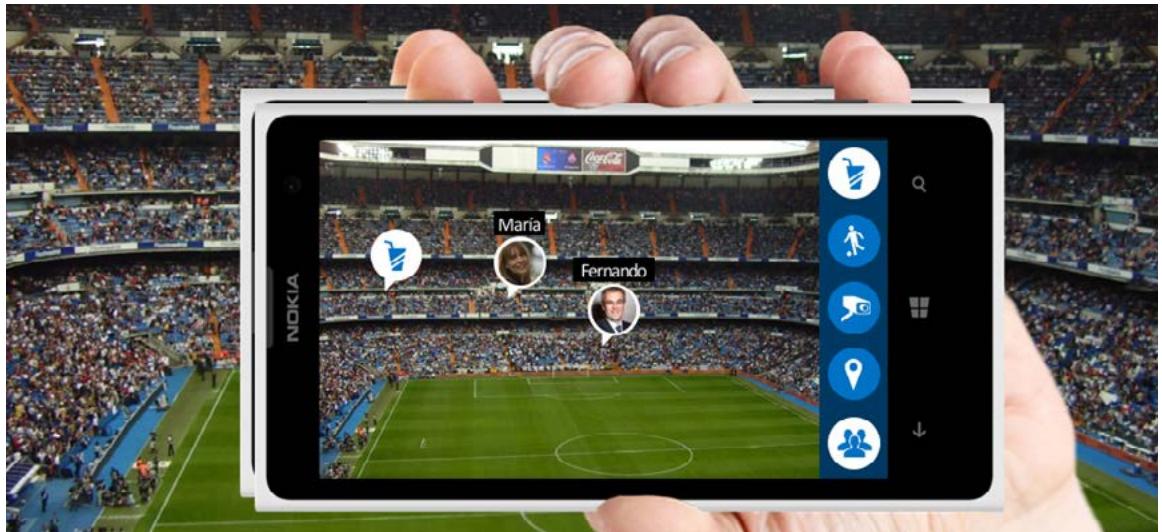


Figure 5-3 Fan experience at the stadium

At home, fans get a virtual stadium experience, streamed from the cloud to any

device, anywhere in the world:



Figure 5-4 Experience the stadium from anywhere

And the excited fan at home can also watch the game on the big screen while getting additional information about the game and

perhaps even buying a game shirt on their mobile device: A truly immersive game-day experience.

## Conceptual architecture

Starting with ideation, Real Madrid ultimately created a platform for online engagement with their fans. Their "Fan Engagement Platform," based on Microsoft Dynamics, tracks individual customer preferences and activities, and uses them to provide a personalized, 1:1 experience for every one of their fans.

The video platform not only provides game-day experiences but allows fans to search using criteria, such as games where the club

scored a certain number of goals. Telemetry and analytics ensure the system is robust, stable, and is meeting the demand, which always rises as game day approaches.

And the new consumer application, using Microsoft cloud-based Azure Active Directory to authenticate fans, provides a rich, informative experience for Real Madrid's fans, no matter where they are.

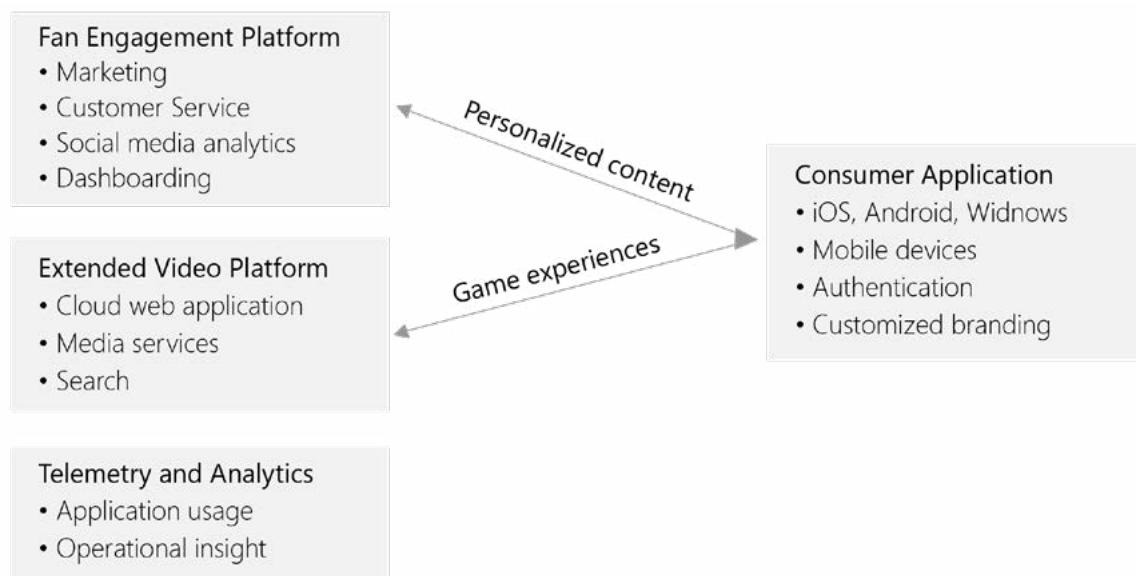


Figure 5-5 Real Madrid conceptual architecture

When deployed, the full solution used Azure cloud services as shown in the diagram below. "We can create a one-to-one relationship with fans around the planet, connecting this huge community of people and making the experience of being

a supporter of Real Madrid much better," concludes Sánchez. "Our goal is to profile all our supporters, to understand who they are, to give them what they want from us, and bring them closer to the club."

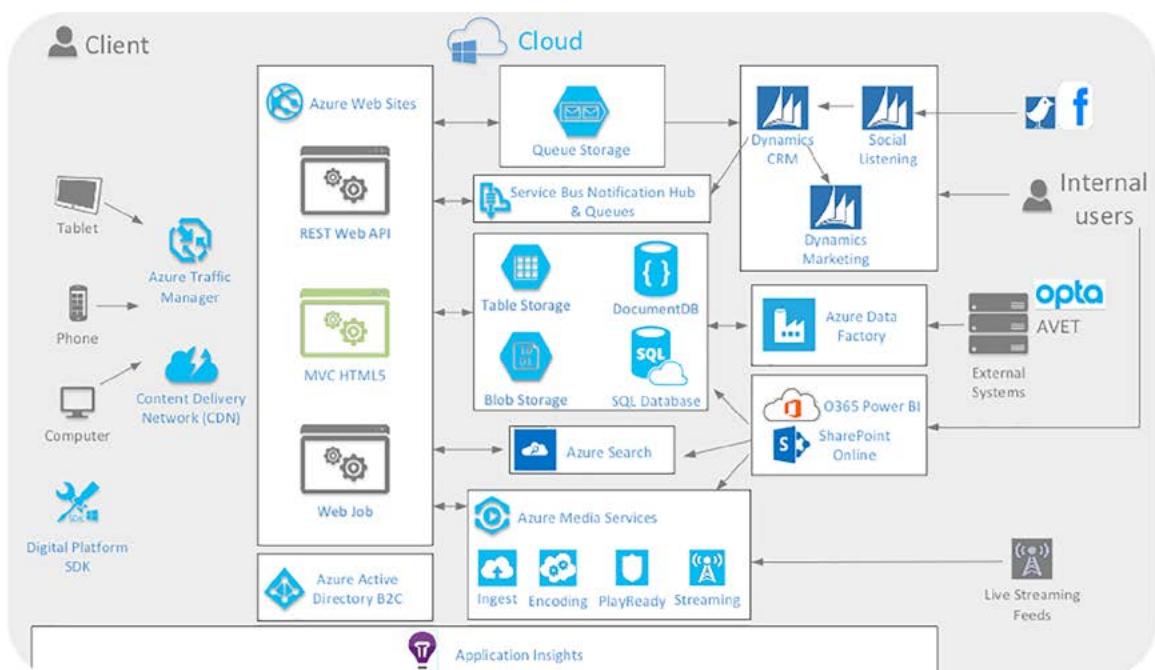


Figure 5-6 Real Madrid architecture

## "MS Airlines"

It's late at night and you've just arrived at your destination – and your luggage is not where it is supposed to be. We've all experienced it. What could be more aggravating?

And if you're the airline, what could be more damaging to your brand?

What follows is a proof of concept Microsoft did with an airline. The goal: To show how straightforward it would be to quickly come to your passenger's aid, and perhaps not only preserve your company's reputation, but also improve it in the process.

## Gisela loses her luggage

After a late night flight, Gisela has disembarked but her luggage hasn't arrived. With her cellphone, she logs on to Facebook Messenger, where "MS Airlines" is a contact.

What she sees then is not a complicated set of menus and navigation, but what appears to be "someone" on the other end asking what she needs. Of course, this is a chatbot deployed by MS Airlines and programmed with some simple rules on how to help



Figure 5-7 Gisela's smartphone

From Gisela's authenticated credentials, the chatbot, working in concert with all of MS

customers with simple tasks, and because it is integrated with Facebook Messenger, she can "talk" to it in the same way she talks to friends and family.

The chatbot immediately recognizes that our passenger is speaking in English, and detects from her first words "A little bit worried" that Gisela is concerned, by using sentiment analysis.

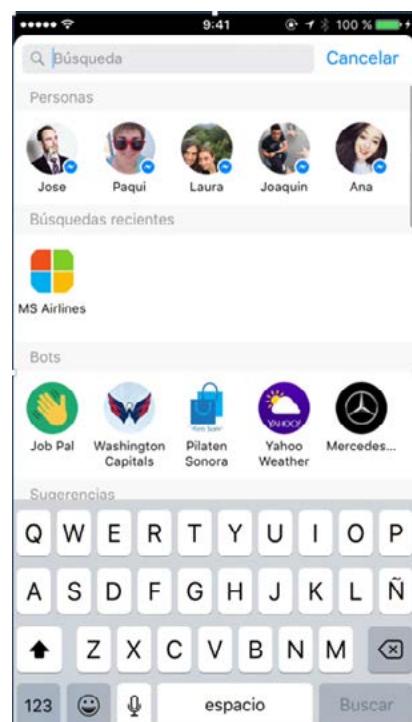


Figure 5-8 Gisela's smartphone

Airlines' backend systems, knows who is calling and what flight she recently traveled on.

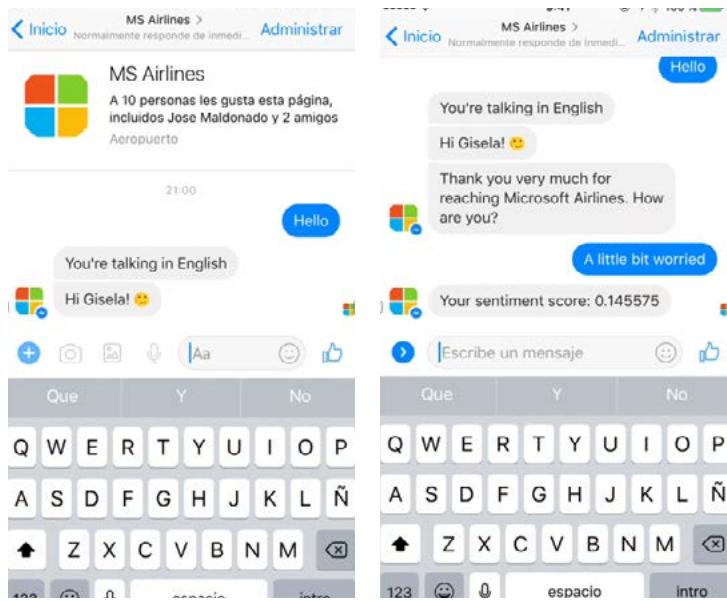


Figure 5-9 Gisela's conversation with a chatbot (1)

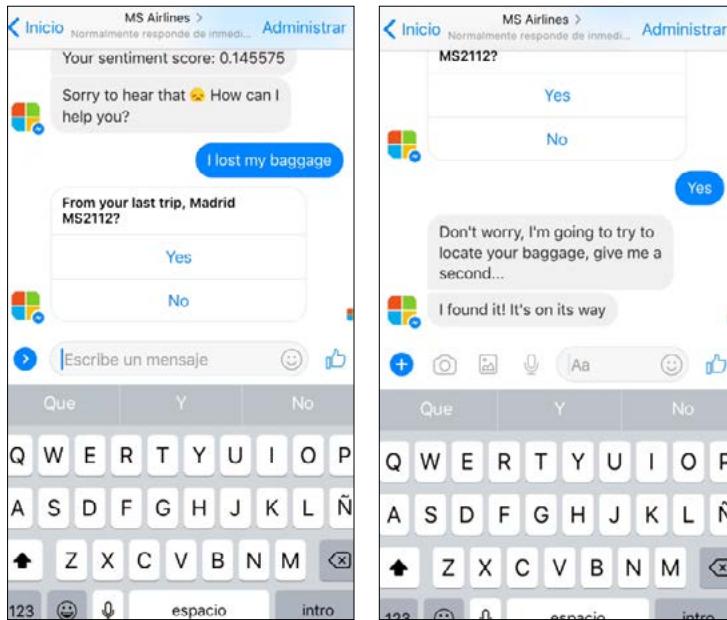


Figure 5-10 Gisela's conversation with a chatbot (2)

And since all baggage is scanned at each step in the flight, the chatbot can query the appropriate systems and find the luggage. Now it's a simple matter of locating where

Gisela is, using (with her permission) the phone's GPS coordinates. The last step is to verify it's really Gisela with a second authenticator (a six-digit code)...

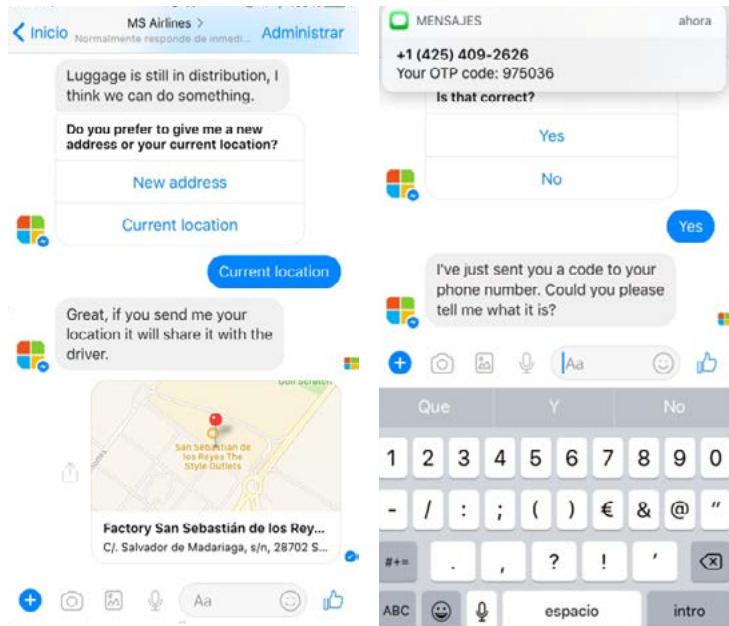


Figure 5-11 Gisela's conversation with a chatbot (3)

... before routing the driver to her – and offering her an upgrade for her troubles.



Figure 5-12 Gisela's conversation with a chatbot (4)

Perhaps Gisela is still not satisfied, but more likely she's thrilled that with a minimum of

fuss, no long delays on hold with a call center, and a great upgrade, her problem is solved.

## Monitoring success

Of course, our mythical airline wants to ensure that these sorts of episodes happen as infrequently as possible, and one way to do that is monitor baggage operations 24x7 all over the world. In this case the team created a dashboard from data aggregated

from all the relevant systems. As you can see, the airline can at a glance be aware of where the trouble spots for lost luggage are, which flights are most affected, and how active their bot is helping customers.

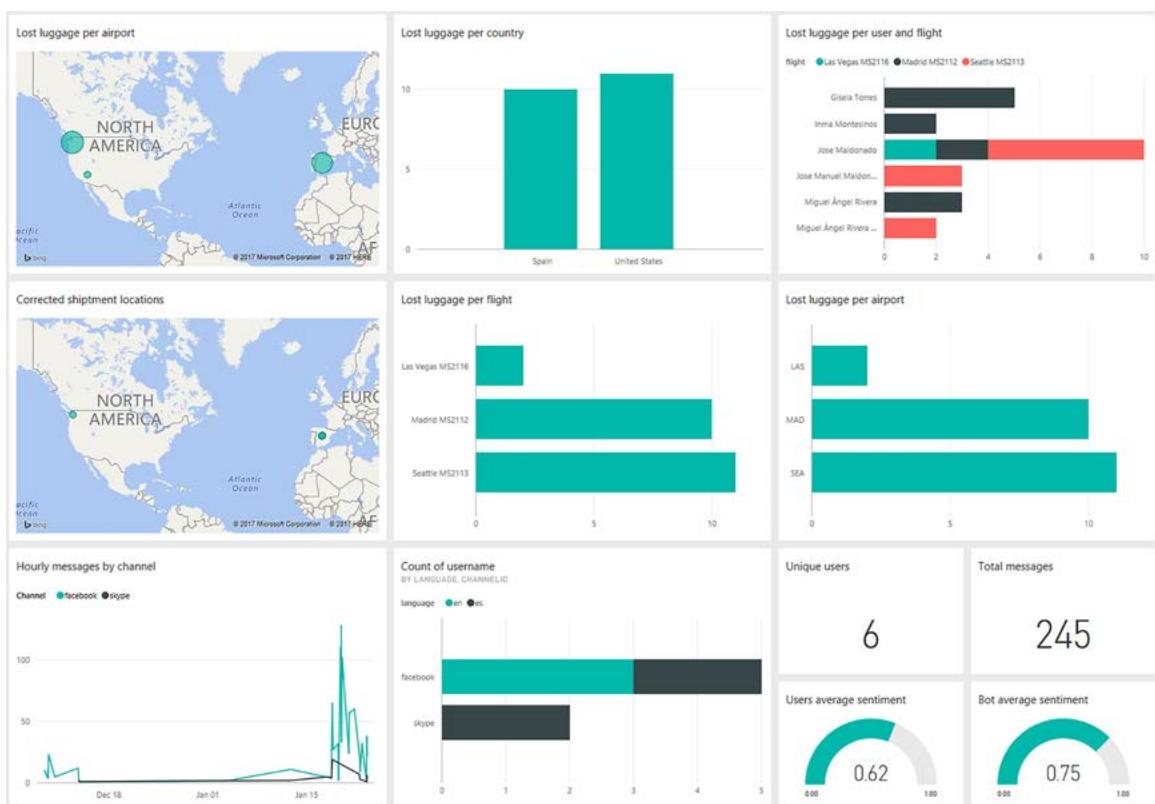


Figure 5-13 Lost luggage dashboard

## Conceptual architecture

What's important about this proof of concept is that it only took a few days for a group of engineers to create, using cloud services that exist today.

Even more important was the realization our customer had that *all the core data they*

*needed for this application was already in their possession.* By connecting those data sources to inexpensive cloud services, they were able to unlock value for themselves and for their customers.

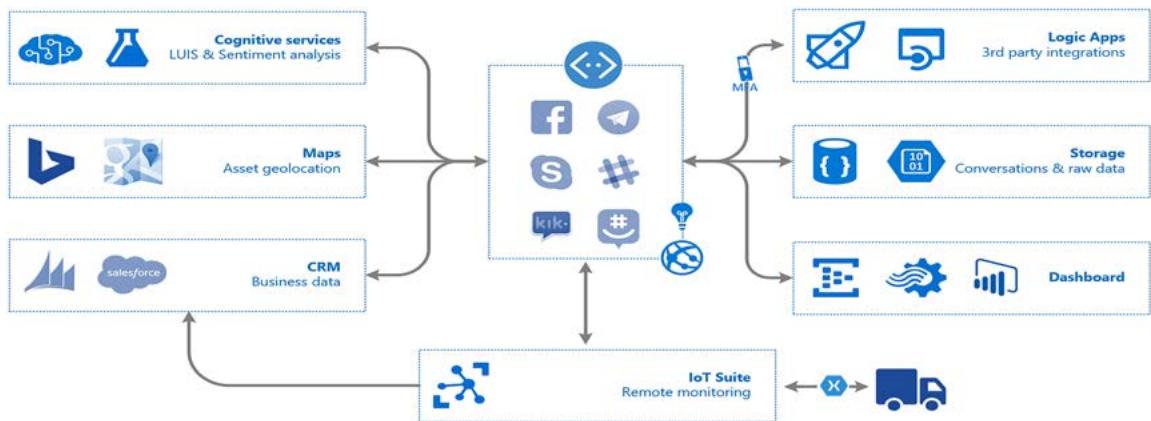


Figure 5-14 MS Airline Conceptual Architecture

Here's a breakdown of the cloud services they used. All are available today so that other businesses could do something equally exciting:

- With cognitive services—in particular, sentiment analysis—the system recognized from Gisela's early message that she was not happy.
- Maps and geolocation services pinpointed where she was.
- A cloud-based customer relationship management application provided information about Gisela's most recent trip.
- Integration software, in the form of easy-to-use Logic Apps (no code required!) connected to the back-end systems—including the baggage handling application.

- Data storage held all of the recent interactions Gisela and other passengers had with the airline.
- The IoT Suite tracked Gisela's baggage with an RFID chip.
- A corporate dashboard tracked overall statistics and trends regarding baggage handling across all lights, and customer sentiment in general.

Let's reiterate: All the core data was there. By connecting the sources and linking them to the cloud, value was unlocked and an unhappy, stressed customer found herself impressed with the airline's customer care.

# "Jamie" can navigate your government for you

Governments are complicated things, and nowhere is that complexity more obvious than in the tens of millions of pages on government websites. How do you register your child for primary school? Somewhere, in the millions of pages of your local government website, perhaps spread over several sites, there are instructions. But how do you find them?

In Singapore, you just ask Jamie.

Jamie's not real. Like Microsoft Airlines' chatbot, James is a conversational application, written by Singapore's government to help its citizens navigate its many websites.

As we showed above, bots can make interacting with computers intuitive and simple. In other words, Jamie is smart. In one example, even though a user was browsing a government tech site, Jamie knew the question was better answered by the Ministry of Education. That Ministry had a well-defined process for student registration: Jamie simply helped our user find it.

Perhaps bots will become the new user interface. They are certainly more natural for us to use on the move, as they understand the languages we speak.

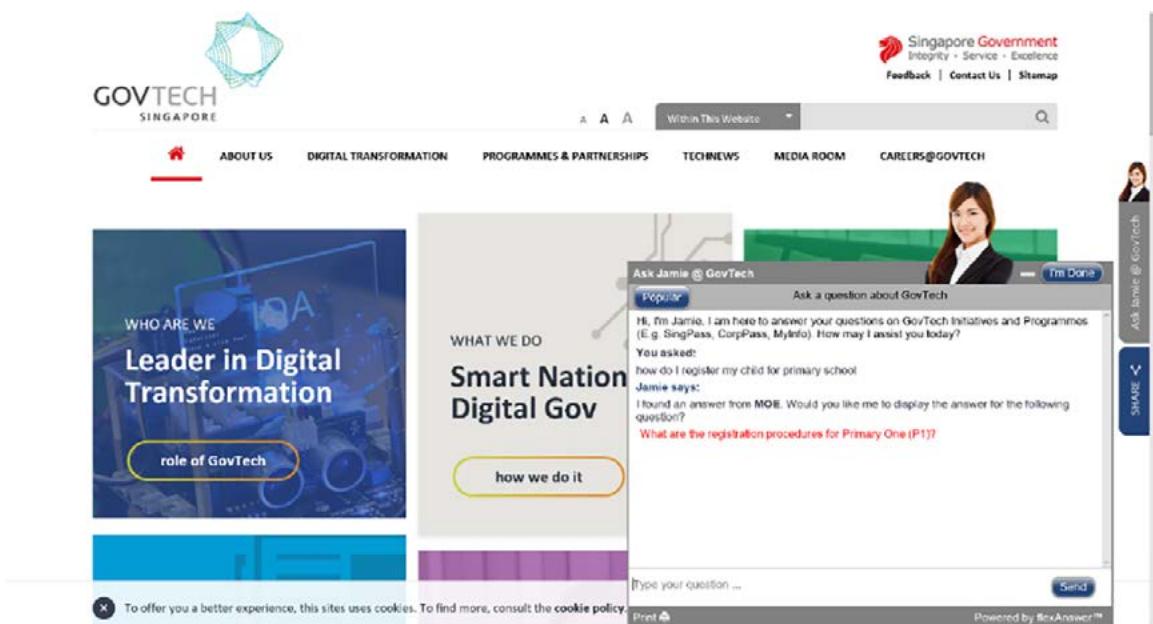


Figure 5-15 Ask Jamie

But they have many other advantages as well, according to Lili Cheng, manager of Microsoft's Future Social Experiences (FUSE) lab at Microsoft Research, and one

of the thought leaders behind the chatbot revolution: "You don't have to follow the rigid structure of a website to find something that's buried many pages deep. You can just ask."

## Conceptual architecture for chatbot applications

These types of applications take advantage of cloud services that make developing them straightforward. Both examples above used the Microsoft bot framework, which includes speech recognition and natural language capabilities. With the bot connector, key phrases can be wired to actions that can

access data in corporate systems. The cognitive services component, used in the Microsoft Airlines example, watches over the user's responses and measures their emotional state, which can then be used to tailor their experience.

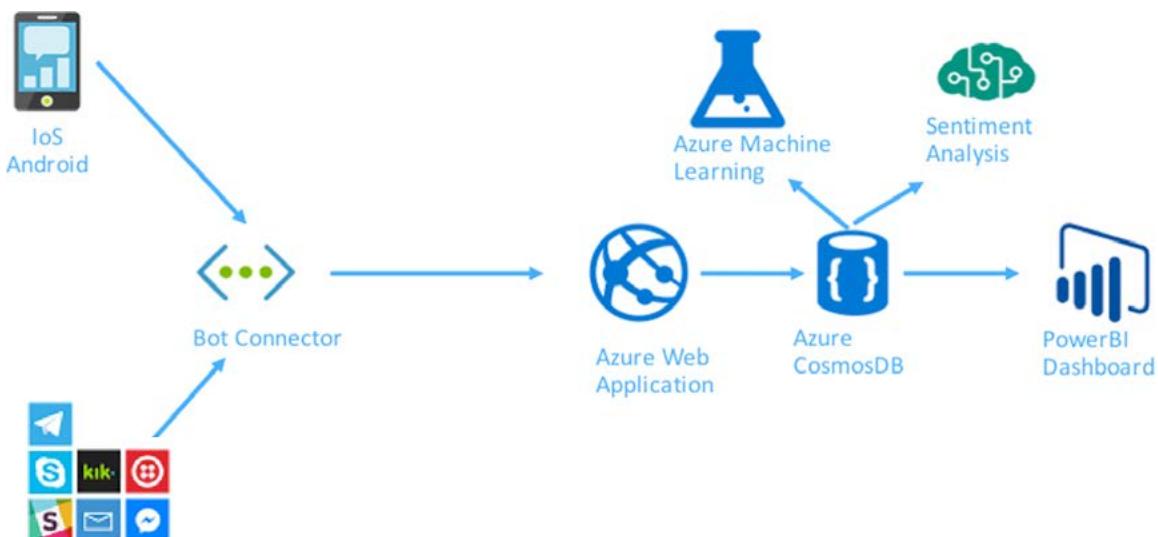


Figure 5-16 Conceptual architecture for chatbot solutions

## Staying close to your customers drives your business forward

We've seen in this section several examples of how bringing together data that companies already had and applying new interface technologies like bots and mobile video can utterly change the customer experience.

Think the "Microsoft Airlines" example was remarkable? Remember, it only took a week to build the prototype. Of course, connecting it to all the real-life systems would have taken

longer, but the POC allowed businesses and IT to see it, touch it, and understand how easy it would be to build this revolutionary capability.

Real Madrid had considerable amounts of customer data. An imaginative and driven executive team, working with Microsoft's cloud technologies, enabled them to use it in new ways to drive great experiences, increase fan loyalty, and drive revenue.

# Chapter 6.

# Empower your employees

Many executives now believe—rightly—that a skilled and motivated workforce is a key metric that can drive business success. Recently, the Harvard Business Review polled senior executives about the importance of employee engagement, and the results were striking. Some 71% of executives listed it as a key driver of success—yet only 24% of the same group said their employees were highly engaged!

## Why?

HBR found several key drivers behind employee engagement, including clear and consistent communication of goals to

employees by senior management, and knowledge by each individual employee about how he or she contributes to achieving corporate strategy and goals.

## Macy's uses cloud-based collaboration for "one version of the truth"

If you're a manager working on the floor of a retail store, it's critically important to know how your employees are doing, and when you need to coach them with advice or information.

Here's what Sue McMahon, Group Vice President of Retail Communication at Macy's, wrote in a blog article recently:

*At Macy's, we're keenly focused on removing friction points from the customer experience. We strive to deliver the great brands and trend-right fashion our customers crave*

*while providing the friendly, helpful and convenient service that they expect. Putting customers first requires us to think about every facet of their experience, from product displays and store ambiance, to clarity of pricing and the assistance provided by our store associates. Our evergreen objective is to identify potential friction in the customer journey and aggressively solve for it.*

*Through this focus, we recognized a significant opportunity to provide more robust tools that empower the store leaders who engage both selling-floor associates and our customers. Store managers and their teams have historically spent a significant portion of each day on a computer tucked in an office, away from the sales floor. That meant that our managers—who have the most experience serving customers and coaching associates, the most knowledge of company strategy, and the responsibility for the look and feel of the store—were spending upwards of a quarter of their day off the sales floor, greatly diminishing their impact.*

*We've transformed our stores through technology by giving our leaders all the communication, information and data they need at their fingertips, without tethering them to a desk. By providing Microsoft Surface devices, we've made them mobile. By giving them Microsoft Office 365, we've enabled unprecedented collaboration and access to information, providing for "one version of the truth." Every device also has our own internal solution called MyStore, which we built in partnership with Microsoft to provide real-time KPI results and staffing levels. And through MyStore on their devices, managers now have single sign-on access to the more than 30 applications,*

*reports and tools they use most often. With easy access to real-time results and vital information while out on the sales floor, managers are better equipped to coach and support associates, assist customers, perfect displays and make adjustments on the fly to maximize sales. Enabling store leaders to spend more time on the sales floor, collaborate more effectively and make more informed decisions has had a positive impact not just on day-to-day store operations but also on reducing staff turnover—a problem endemic to the retail industry. Because our managers are more present on the floor, actively engaging their teams, our associates feel more connected to Macy's, they do a better job every day and they're more likely to remain part of our team.*

*Maintaining a consistent customer experience from store to store can be tough for retailers. It's particularly challenging for us, with more than 700 stores across 45 states. We're using Office 365 to connect our multi-unit managers more fluidly with their stores and increase their leadership impact. For instance, one of our market vice presidents wanted to see how his group of stores was executing in preparation for a big event. The challenge was that several of the stores were located hours away from each other. Instead of getting on a plane*

*or into a car, he hopped onto a Skype for Business video call and virtually toured these locations with his store management teams, identifying opportunities to improve execution and consistency. He also saw a unique merchandising approach in one store and, using Office 365 Video, immediately shared it with all his other stores to enhance the campaign throughout the entire market. This ability to share best practices easily and highlight the good work of individual associates throughout the company really helps us provide the best possible shopping experience. Our customer satisfaction scores are on the upswing, clear evidence of these strategies at work.*

*We've already seen the benefits of using the Microsoft Cloud and devices to empower our store leaders. And we're excited about what the future holds as we embrace other Office 365 capabilities—such as analytics and telephony. We believe that our partnership with Microsoft to create and leverage best-in-class technology will allow us to make the customer experience more seamless across all channels and mitigate the disruption impacting today's retail environment.*

*So, to sum up, not only did cloud technology make employees and managers more engaged, it brought them closer together, and productivity jumped.*

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## Modernizing HR at Microsoft

Unsurprisingly, Microsoft itself has used cloud technologies to improve employee collaboration and engagement. In its HR Reimagined initiative, Human Resources executives focused on delivering HR not as a set of applications, but rather as a cohesive service.

This was easier said than done. Some of the issues affecting HR included:

- Different systems and processes in the countries where Microsoft operates affected the company's ability to make decisions on a global scale.
- Tools had multiplied over the years into a patchwork of disjointed interfaces and

functionality, delivering a sub-optimal experience that was not cost effective.

- Many tools did not work on the corporate network or on mobile devices, not living up to the company's mobile-first, cloud-first strategy.
- Systems were not easy to customize for different levels of engagement with employees or prospective employees, to more effectively attract, develop, and retain talent.
- Opportunities were lost because there was no simple way for employees to find and take training to develop their skills.

- To be a strategic asset for the company's transformation, HR had to undergo an extreme makeover. It needed to deliver a seamless, engaging service experience to over 100,000 employees and potential new hires worldwide, delivering greater business impact, and driving HR and business innovation.

WA global HR team from all over Microsoft worked together to form a new vision for an all-encompassing, tightly integrated HR portal that provides holistic, on-demand, anywhere convenience. The service had to support all of HR's global business needs.

Even though HR data exists in multiple sources, ranging from the core SAP ERP system to CRM, SharePoint, and other systems, the team wanted to provide an intuitive user interface that would help employees navigate their data:

To support major strategic and cultural shifts at Microsoft, the HR Reimagined initiative helped the company deliver a seamless, engaging HR experience for over 100,000 employees worldwide. Microsoft Azure was an easy choice for the platform to support this global effort, enabling HR to take advantage of their existing investments in software for an industry-best solution.

The screenshot shows the HRWeb portal interface. At the top, there is a navigation bar with links for 'My Information', 'My Benefits', 'My Career', 'Life at Microsoft', a search bar, and an 'ASK' button. Below the navigation bar, there is a banner featuring a photo of Julian Plenty, his title 'SENIOR PRODUCER', and his manager 'Reports to: Lisa Anderson'. The main content area is titled 'My Personal Information'. It has three main sections: 'PERSONAL', 'EMPLOYMENT', and 'FINANCIAL'. Under 'PERSONAL', there are fields for Name (Bryan Plenty), Gender (Male), Birth date (10/14/1978), Marital status (Single), and Race ethnicity (Lorem ipsum). There is also a note about providing documentation for a name change or marital status change, with a 'Read more...' link. Under 'EMPLOYMENT', there are fields for Building (Studio-C), Room (4321), Region (Puget Sound), Work Phone (111 222-3333), and a note about requesting an office move. Under 'HOME', there is a field for Address (123 Main St, Seattle, WA 98101) and a note about updating it. On the right side, there is a sidebar titled 'Information & Resources' containing two 'Lorem ipsum' placeholder sections.

Figure 6-1 My Personal Information page on the HRweb portal

## Employee portal

To support the worldwide Microsoft workforce, the service has to be accessible from anywhere. Microsoft Azure operates out of 17 regions around the world, all of which have numerous data centers. This extensive global infrastructure was an obvious choice for the agile and resilient platform of HR's global service.

The service also has to be highly available. If a web server has a hardware failure, Azure will automatically replace it. To help manage user access, HR federated user identities to the Azure Active Directory and enabled multi-factor authentication for more secure sign-in.

During peak usage, such as when employee reviews occur, the system has to meet demand. Azure's platform as a service (PaaS) components automatically scale up, adjusting the number of servers to meet the current load.

HR was able to provide compelling mobile solutions on a wide variety of devices, thanks

to the Azure App Service. It provides full-featured support for cross-platform and native apps for iOS, Android, Windows, and Mac. Using software as a service (SaaS), HR was able to use existing software by both Microsoft and third parties, such as Microsoft SharePoint, Microsoft Dynamics CRM, and SAP. Because they decreased the number of tools and designed a robust service, HR was able to use SAP as the sole source of employee HR data. To get address information, for example, the user interface (UI) communicates with SAP in real-time through Azure.

Employees and managers have real-time access to the appropriate HR data and exceptional tools, which empower them to perform more HR self-service tasks. HR also provides a full range of ready-to-use tools and services to create, deploy, and manage reports, through Microsoft SQL Server Reporting Services running on an Azure virtual machine.

## Manager portal

With the manager's self-service Team page on HRweb (shown in Figure 6-2), managers now have one place to perform all HR actions for their employees, such as changing an employment profile, title, compensation, and even promotions.

With even just a few employees, it's easy for a manager to lose track of the HR

transactions that are in progress and the status of each one. On their Team page, managers see the status of transactions that are in progress and can click a link to view the details. The Team page is on HRweb, which is built on Azure, so it is available anytime, off the corporate network, and on any device. Reporting is provided and based on SQL Services.

Eun Ho Schierholz  
DIR IT SOLUTION MGMT | Reports to Tamara Sæter

EMPLOYEE NAME	MANAGER	STANDARD TITLE	NEW ACTION	TRANSACTION STATUS
Alejandro Odinsen (carineb)	RAJAMK	IT Solution Manager		
Carol Lee (shcorb)	RAJAMK	IT Solution Manager		
David Carandang (aparnac)	RAJAMK	IT Solution Manager		Title Change - Pending Processing Transfer - Pending Processing
Jason Luostarinen (chmead)	RAJAMK	IT Solution Manager		Resignation - Pending Processing
Suzanne Huoponen (srinisav) <sup>ab</sup>	RAJAMK	IT Program Manager		Resignation - Pending Processing
yongjun Zhao (jbloedow)	RAJAMK	IT Solution Manager		
Yuxiang Ouchi (ramanakv)	RAJAMK	IT Solution Manager		Transfer - Pending Processing

Figure 6-2. The manager self-service team page on the HRweb portal

## Answering HR-related employee questions

HR implemented AskHR, based on Microsoft Dynamics CRM, to efficiently manage HR-related questions and tasks. Employees can access it via the HRweb portal, email, and telephone. Microsoft digitized and centralized data to enable robust analysis of employee issues.

Microsoft Dynamics Unified Service Desk provides agents in a central support center with a tool that provides all the necessary

data (Figure 5) for each employee, no matter what country or Microsoft division they are in.

Elevated support is provided by phone, taking advantage of the company's worldwide deployment of Skype for Business. This is used for complicated or sensitive issues, Tier 2 support, increased accuracy in response, and legal requirements.

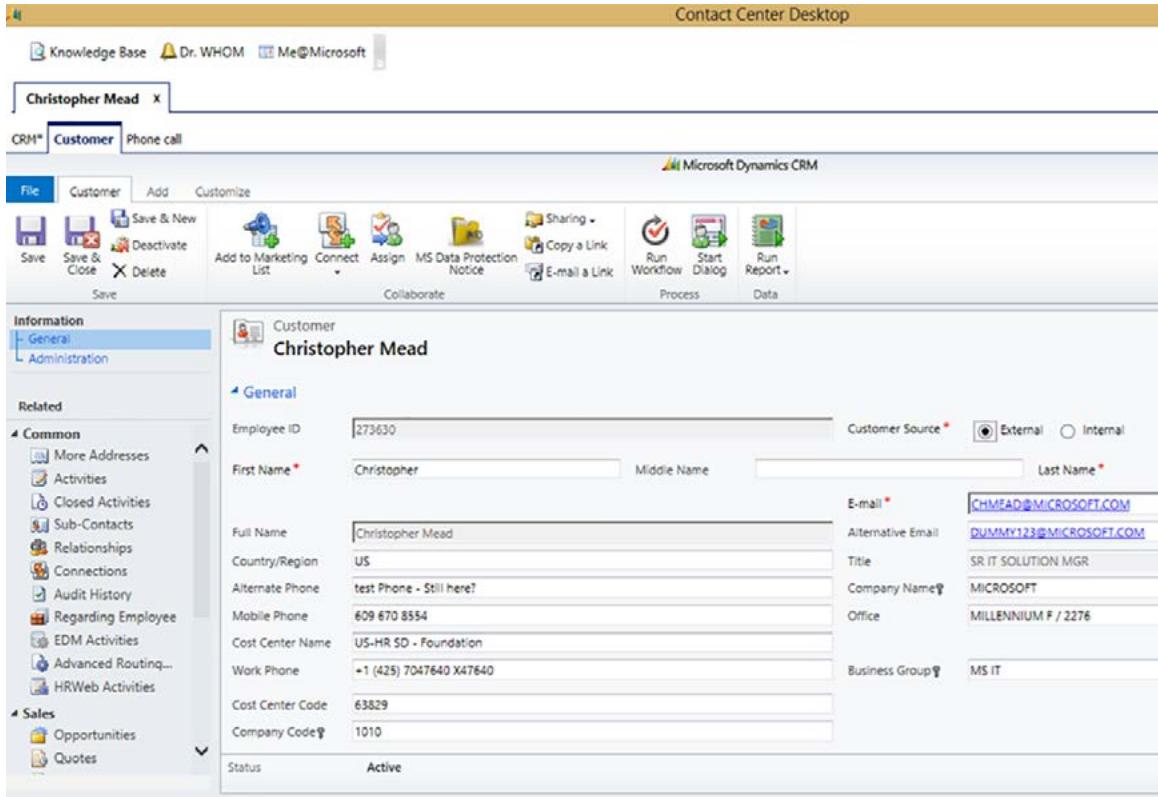


Figure 6-3. The AskHR agents' Microsoft Dynamics Unified Service Desk

## Enable BI analytics

HR is making data available to internal customers through self-service software called Power BI. The data comes from different cloud-based sources, such as Microsoft Dynamics and SAP, as well as sources on-site, but the customers can see all of their data on a single live dashboard.

Executives are currently the target audience for analytics. They are using the dashboards HR provides, as well as creating their own, to visualize data that's important to them so they can more easily foresee trends (Figure 6). They explore data further by using the

underlying interactive reports to discover new insights, which can then be pinned back onto the dashboard to monitor going forward. They are sharing their dashboards and reports with their teams and across the company. They're also interacting with their dashboards and reports on the go, in a touch-optimized experience with the Power BI app for Windows and iOS.

One of the ways they are using self-service Power BI is to predict employee attrition, which helps to ensure that Microsoft is staffed to meet business needs.

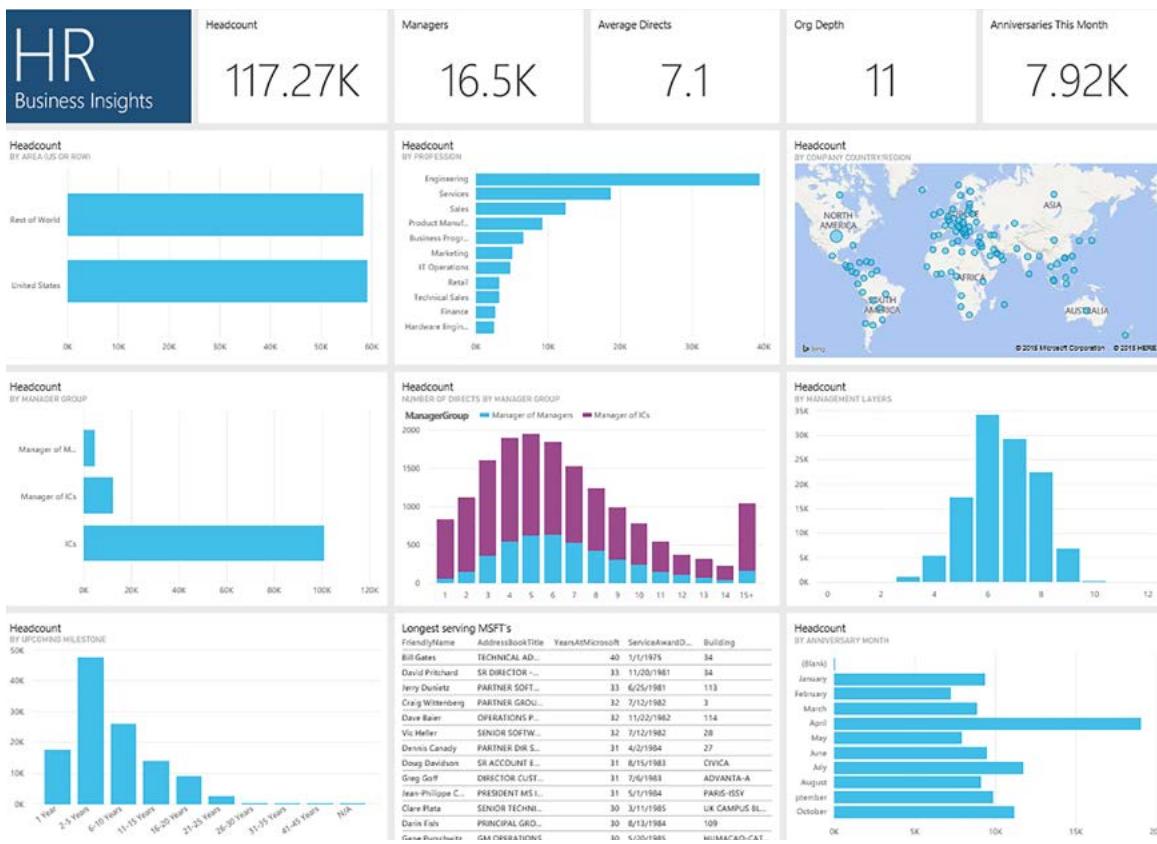


Figure 6-4. HR Business Insights Power BI-based dashboard

## Attract talent

### Recruiting

HR changed the way recruiters at Microsoft share prospects across the company. Recruiters used to have their own lists of prospects, which weren't easily shared or analyzed. And when recruiters left, their lists left with them. With the new global shared service, recruiters store their interactions in a shared service built on Microsoft Dynamics CRM.

Microsoft embraced talent analytics to utilize the huge volume of data it generates from the company's recruiting efforts. HR can adjust how they deploy their recruiters—such as increasing or decreasing recruiting at a university, shifting resources where the need is greatest—to get higher returns on their efforts.

The millennial generation relates differently to technology and social networks than people just a few years before. To attract and retain top people, Microsoft needed to connect with candidates and employees in richer, more fluid, and interactive ways. It implemented social recruiting, taking advantage of the tools

and resources people use in their everyday life. HR is leveraging the power of social networks to source and engage candidates. Recruiters can view a candidate's LinkedIn profile within CRM instead of using an outdated resume from company files. They can tag and enter notes about candidates when they interact.

## Candidate experience and onboarding

HR transformed the candidate experience. Throughout the interview process, prospective hires are encouraged to use the Candidate Experience app (Figure 6-5), built on Azure and accessible through

the devices of their choice. The app is a digital companion for prospects during the interview process and enables them to experience the company's mobile-first, cloud-first strategy.

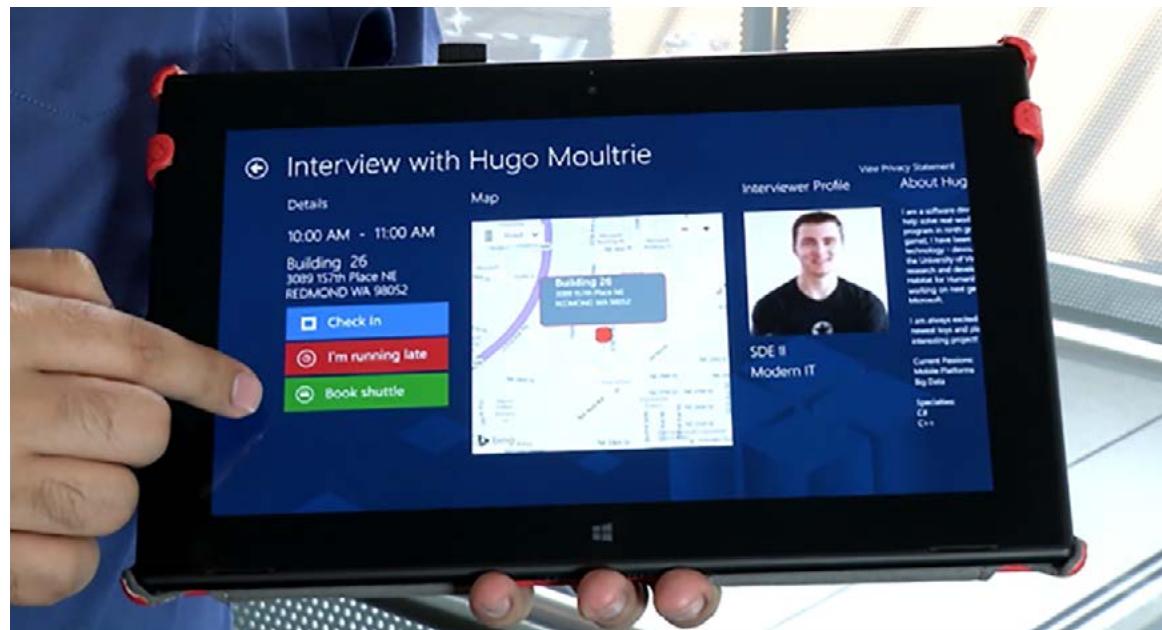


Figure 6-5. The Candidate Experience app

Through the Candidate Experience app, prospective hires can check in for interviews, view the interview schedule, learn more about their interviewers (including biographies that are pulled from LinkedIn), book a shuttle to an interview, get alerts if someone is running

late, and get information about the city they're interviewing in.

When candidates are hired, to help ease them into their job, HR provides new employees with an onboarding dashboard on HRweb (Figure 6-6).

Through the Onboarding dashboard, new employees can perform tasks, such as create or update their LinkedIn profile, get to know

their teammates, see what recent training their peers have taken, and view upcoming meetings.



Figure 6-6. The Onboarding dashboard on the HRweb portal

## Develop talent

### Employee learning and readiness

In a huge multinational company like Microsoft, it's a challenge to provide consistent training. Employees were confused about what training was available, what was required, and where to get it. There were many sources of training—Role Guide, a Windows 8 app built on Azure that provides targeted learning; Infopedia, an employee-sourced site built on SharePoint Online; and Academy, a site used to host webcasts and make them available on-demand.

HR needed a new approach to the learning experience to ensure employees, managers, and leaders were ready, engaged, and empowered to drive the company's transformation and cultural priorities. They

decided they could achieve this through better integration of formal training, such as Role Guide, and informal training, such as Infopedia. They standardized Infopedia (Figure 6-7), making it the learning portal at Microsoft and targeting learning opportunities based on business priorities. Infopedia now provides training about Microsoft and its products as well as information about:

- Analysis of the competition.
- Reviews of different industries and the public sector.
- Required training and when it's due.
- Recommended training.

It also provides the ability to build-out a training plan and to develop skills for the current job or the next. Employees can

stay on top of it all with live tile and email notifications.

The screenshot shows the Infopedia learning portal interface. At the top, there's a dark blue header with the word "Infopedia". Below the header, a navigation bar includes links for Home, Products, Compete, Industries, Campaigns, Licensing, Demos, Role Guide, and More. A "SMSG Ready Hubs" section follows, featuring eight colored tiles: Azure (blue), CRM (dark blue), Dynamics (blue), Office 365 (red), Skype for Business (light blue), Windows 10 (purple), Compete (green), and Roadmaps (dark blue). To the right of the Roadmaps tile is a link "See all Hubs >". Below this is a "Featured Content" section with three cards: "Azure Technical Certification" (blue card with a cloud icon), "Windows 10 for Enterprise" (blue card with a laptop icon), and a third card showing a collage of people.

Figure 6-7. Infopedia: the learning portal at Microsoft

## Conceptual architecture

<b>Devices</b> Anytime Anywhere						
<b>Personas</b>	Candidate	Employee	Manager	HR Line	HR Operations	
<b>HR Processes</b>	Hire / Onboard / Train / Employee and Manager Self Services / Profile / Mentor					
<b>Functions</b>	Data / Reports / Profile		Letters / Notifications		Doc Management	
	Security	Content	Ask HR	Reporting	Workflow	UX
<b>Software</b>	SAP	CRM	SharePoint	eRec	HR Data Warehouse	Others
<b>Platform</b>	Azure					

Figure 6-8. HRweb conceptual architecture

# Staying close to your employees also drives your business forward

Attracting and retaining a talented, motivated, and productive workforce has to rank high on any CEO's list of goals and objectives. In fact, HCL Technologies, a global services provider, made the decision in the late 2000s to put employees first—and customers second, going against centuries of conventional business wisdom. But HCL managed to create a new corporate culture, one that

was able to attract the sorts of creative individuals necessary for their business.

Why would HCL adopt such a strategy, and why would it be successful? Perhaps because they recognized, as many have now, that employees are critical assets, especially in information- and knowledge-based companies—which in this age nearly all are.

# Chapter 7.

# Optimize your operations

Companies are now collecting data at an unprecedented rate. According to all forecasts, the volume, velocity and variety—the 3 V's, as Gartner analyst Doug Laney termed them in 2001—will continue to grow. But data by itself is not information, the stuff that we can learn from. Today, however, we can use technology to transform raw data into information—driving significant results.

In asset-intensive businesses like factories, telemetry provides a continuous stream of data, with sensors on pipelines, valves, actuators, and factory floor devices sending constant status updates. The devices they manufacture—cars, trucks, aircraft—also generate massive amounts of data. One estimate provided by Intel CEO Brian

Krzanich suggests that an autonomous, self-driving car with cameras, radar, sonar, GPS, and laser-ranging lidar will generate or use 4,000 gigabytes of data every day.

There can be a lot of information wrapped up in that raw data. And with cloud-based tools, we can unlock it.

## Call center analytics for a bank

But it isn't just manufacturers that have to manage a huge data stream. In the financial services industry, like in many regulated spaces, recordings of all customer conversations must be retained for periods of time, to satisfy eDiscovery requirements.

In most cases, these audio files reside in cold storage, never to be accessed.

But what if you could get some business value from them?

## It's not just what your customers are saying, but how they're saying it

Here is José Maldonado, a Microsoft Cloud Solutions architect, describing an ideation session with a financial customer:

*We were in conversations with the head of analytics of a [large] bank, discussing different scenarios around cognitive services. He told us they had lots of call center conversations just laying around, stored, never to be used again. We started thinking about extracting insights from those conversations. What were the topics that were being talked about the most? What was the sentiment of the customer calling during the conversation? Were there interesting keywords? The goal was to enrich the call center operator scripts.*

Maldonado and the customer discussed using AI capabilities in the cloud—speech recognition, sentiment analysis and search—to enable call center operators to build more useful prompts and better serve their callers. Not only that, but with the sentiment analysis features in Microsoft’s Cortana Intelligence Suite, the bank could keep tabs on how their customers were feeling about them, discover and track trends, and take remedial action if necessary.

In the past, call center operators manually tagged conversations with keywords, and these calls could be looked up later by other operators searching for solutions. With this new AI-driven approach, the bank could understand what the conversation was about and the sentiment of the customer, and automatically select keywords. Those in turn could help train operators going forward and could even be used to help operators do cross- or up-selling.

With these analytics, the bank could also see which operators did a better job in placating an angry customer, or potentially know who were driving additional sales. Also, since every conversation was stored in a document database, search capabilities could provide the exact time the phrase being searched was spoken, avoiding the need to listen to whole conversations.

Says Maldonado:

*In the beginning, they were just looking to understand what our capabilities were, but we decided to go one step further and prove this was actually possible by creating a proof of concept environment in less than one week.*

While that sounds fast, what’s most remarkable is that a week isn’t exceptional for a cloud development—it’s *typical*.



Figure 7-1 Sentiment analysis dashboard of recorded call center conversations

Here is the dashboard they created, showing graphically the variety of sentiment feedback the bank was able to capture and reveal. The dashboard was based on Microsoft Power BI.

This is a great example of how large volumes of dormant data can find new life and value simply by being connected to new technologies.

## Conceptual architecture

Here is a view of the architecture the team built:

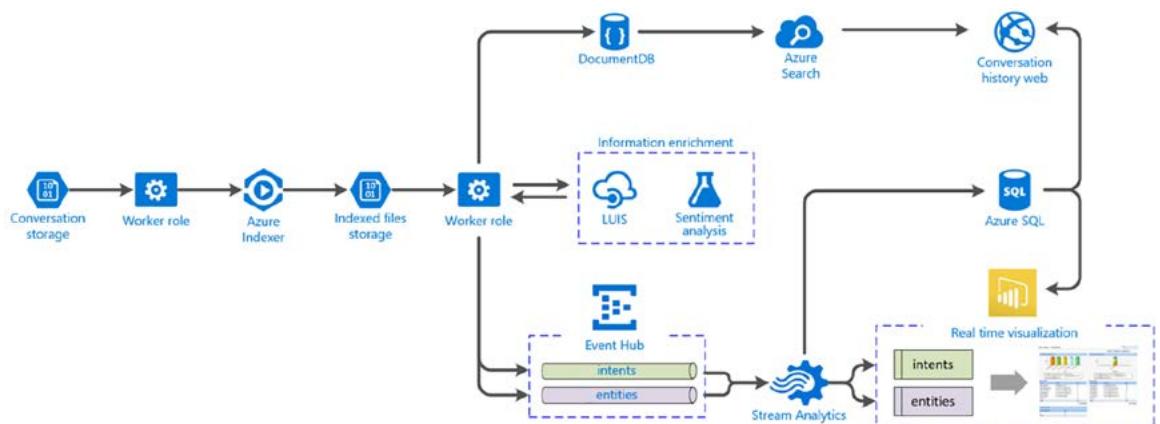


Figure 7-2 Conceptual architecture for sentiment analysis application

The core components here are the two elements in the middle—LUIS (Language Understanding Intelligent Service), and the sentiment analysis engine (Azure Text Analytics). LUIS can transcribe the recordings into text, and Text Analytics looks for key phrases to infer the user's state of mind.

The architecture shown also includes capabilities to tag the parsed data so that it is accessible via search operations.

All these software components exist in the cloud, so building the application is simply a matter of wiring them up to the appropriate data sources.

## Machine learning saves water

Data can teach you things, and based on what has been learned, you can take action to make your business more profitable or more efficient.

For Carnival Maritime, understanding how resources are used aboard ship, and being able to predict how much of any resource will be needed, is mission-critical. Fresh water, for example, is used not only by passengers but also to wash and clean the vessel. Individuals use vastly different amounts of water each day, and different nationalities shower at different times of the day.

Predict wrong, and the ship must expend fuel bunkering more water, or produce it at sea—both unwanted extra expenses. This is what traditional methods based on captains' experience and rule-of-thumb calculation models have led to. So how do you monitor water consumption and make accurate predictions?

Alexander Klingelhofer, Director of Continuous Improvement at Carnival Maritime, said:

*We want to produce our own water, and we want to understand when to produce it so that, ideally, we never have to bunker any water.*



Figure 7-3 Carnival cruise lines

*This is not only cost-effective but it also ensures a stable and superior water quality.*

To help improve its water usage calculation—and therefore its water production calculation—Carnival Maritime turned to Microsoft partner Arundo Analytics, based in Houston, Texas. Arundo built a microservice on its proprietary big-data platform. Using the machine learning models, APIs, and templates from Microsoft Cortana Intelligence Suite, Arundo found it could analyze historical data sets along with data that captures the speed and position of the ships, age and nationality of the

passengers, and historical weather data to better understand exactly what drives water consumption. Because the platform runs on Microsoft Azure, it can connect to and get value from data of any volume, variety, and velocity from both Carnival Maritime's cloud and on-premises databases.

"There's a lot of work associated with extracting and reconciling the volume of data our ships produce," says Klingelhoefer. "Arundo has shown us how to make that data more readily available through Azure-based services—and that helps us move toward digitalization and using data to improve our operations."

With the resulting information, Carnival Maritime can better predict how much water a ship will need for a specific route with a particular set of guests. When water production is more efficient, the ship has just the right volume of water for passenger use, reduces its need to bunker water, and eliminates the need to carry extra resources.

By optimizing water consumption—producing water via evaporators and reverse osmosis systems instead of by bunkering it—each Costa Group ship could save more than \$200,000 a year. These water optimization measures also contribute to the company's continuous goal of reducing CO<sub>2</sub> emissions.

## MetLife

The health and life insurance company MetLife was voted the most admired company in its category by Fortune magazine in 2015. The reason for its success? It took advantage of the cloud for its large-scale compute operations.

MetLife's actuarial teams run complex simulations on large data sets to generate financial projections and perform risk analysis. Until recently, such calculations would have been done on server farms on-premises. When not running analyses, all those servers would lie idle.

By using high-performance pay-as-you-go computing features, database and analytics in the cloud, MetLife saves time and money. Infrastructure savings are estimated at between 45 and 55%. As Brian Cartwright, Assistant Vice President at MetLife, says, "When processing is complete, we can scale the environment back down so we only pay for the capacity we actually use."

As a result, the cloud-based platform built by MetLife has become their "strategic platform for actuarial processing," Cartwright adds, centralizing many functions and simplifying others.

## Benefits of the cloud

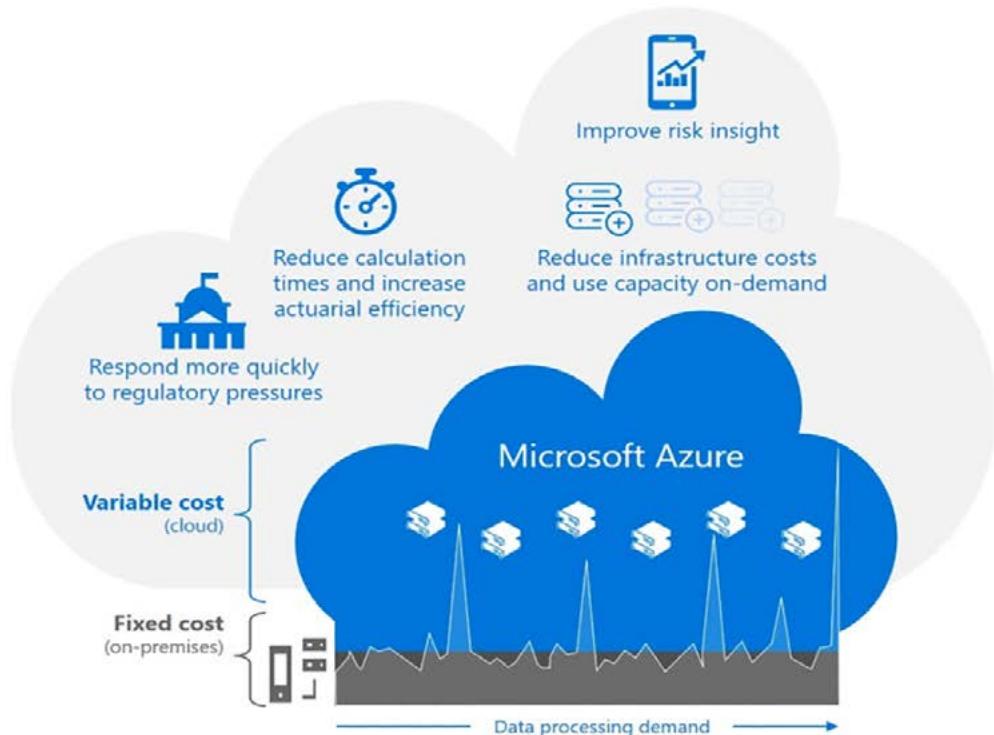


Figure 7-4 MetLife cloud benefits

Here you can see the functions moved to the cloud by MetLife. Note the “bursty” nature of demand; like so many other industries, MetLife sees demand peak from time to time, with periods of low utilization in between: great opportunities for cost savings.

Of course, there are many examples. GEICO, a direct auto insurer in the US since 1936, moved to the cloud and saw innovation grow: “With DevOps and Azure, we’re able to reduce our new-feature release cycle down to one week, and we think we can even speed that up,” noted Fikri Larguet, Director of Cloud Services at GEICO.

That acceleration comes from faster provisioning of development resources and from reallocating engineers from standing up infrastructure to developing new customer engagement models—refocusing engineers to business-value-add from operations that do not contribute directly to business results. With its nimble cloud infrastructure, GEICO can test and refine ideas faster, which helps it improve the customer experience at a faster cadence.

# Getting your shipment there faster—and finding new revenue streams in the process

Damco, based in The Hague, Netherlands, is one of the world's leading providers of freight forwarding and supply chain management services. In the summer of 2015, its CIO, Henning Goldmann, started thinking about how to use technology to optimize his business.

During envisioning workshops with Microsoft, Damco discovered that by using data it was already collecting, and supplementing that with other data, the company could provide new visibility to customers about where their shipments were and when they would arrive. The new intelligence could also enable swifter action when unusual circumstances arose.

Ships arrive at different times in different ports; different trucking companies have different performance characteristics; different ports require different amounts of time for customs processing; and so on. Sometimes weather interferes with a ship's arrival, or slows down port operations, and occasionally, labor disputes at the port or with other partners also cause delays.

All this data and all of these KPIs already existed. Microsoft's team suggested bringing

them all together in an Azure Data Lake. Algorithms could be written to predict when ships would dock or when a shipment would arrive at its destination, and could make recommendations for rerouting where potential disruptions, such as bad weather, might occur.

"It was as if someone was giving oxygen back to them!" says Microsoft Consulting Services Architect Mazhar Leghari of the moment when it became clear what could be done.

In addition to dealing with disruptions, Damco also helps clients have detailed insight into supply chain logistics. "For example, we have one client in the United States that transports goods by truck to shops in South America," explains Goldmann. "They want to be able to know where all their goods are at any given time, when they will reach their destinations, and what is the quantity of goods in each and every container. Our strengths are in the way we co-create solutions with our clients to understand their needs, and the way we use technology to provide insights and also to see trends and spot potential problems and supply chain stresses before something goes wrong."

## Conceptual architecture

Various data sources are directed into the application. Azure Stream Analytics parses incoming newsfeeds for news and weather data that might be relevant. This intelligence, along with the shipping data, is deposited in the Data Lake, where it can be queried.

The initial proof was completed in a short period of time, and has since been expanded to also use Azure Machine Learning to "predict the likelihood of events happening and the resulting impact on revenues, which is extremely valuable to keep down supply chain costs," says Goldmann.

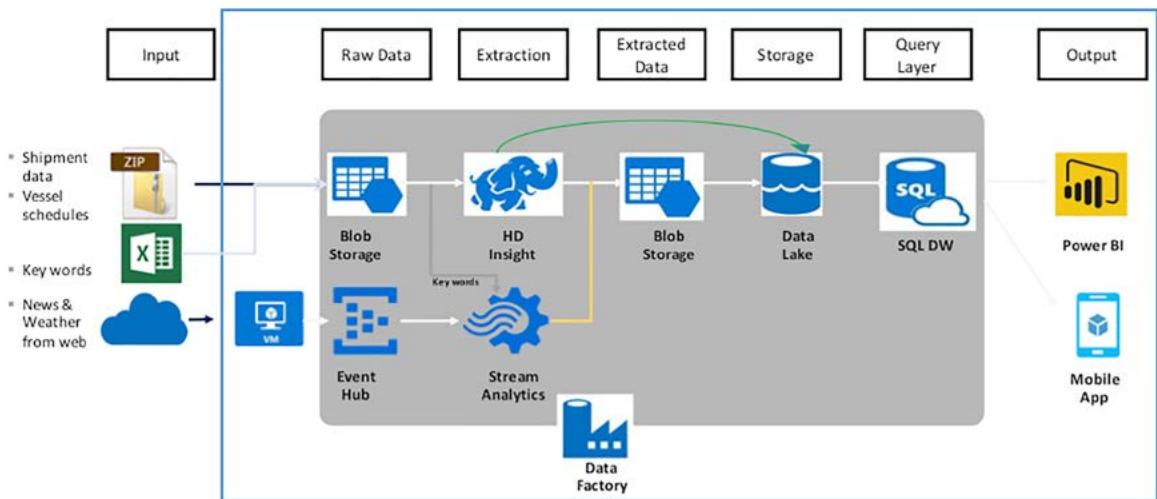


Figure 7-5 Conceptual architecture for Damco shipping solution

New applications are also being built on this platform. Previously, these would have taken anywhere from three to six months to

develop. Today, says Goldmann, the journey from identifying a supply chain challenge to deployment can take as little as two weeks.

## Data drives insights, and success

We live in an Age of Data. The amount of information the world collects and stores is rising exponentially to almost unimaginable levels. The research firm IDC recently proposed that, from 4.4 zettabytes in 2013, it will hit a projected 44 zettabytes in 2020, and an incredible 180 zettabytes by 2025. A zettabyte, in case you were wondering, is a trillion gigabytes.

With all this new data, companies can provide unprecedented levels of service—service that can be continuously improved by collecting data from a wide, dispersed set of endpoints and devices, drawing insights

through advanced analytics, and applying what's learned to introduce improvements.

Technology companies have pioneered this approach but manufacturing, retail, and a host of other industries can reap the same benefits, applying machine learning against previously untapped data to anticipate and solve customer issues before they become significant.

We're just scratching the surface of the potential insights, knowledge and patterns in our data. But how will advanced data tools revolutionize your business?

# Chapter 8.

# Transform your products

All over the world, business leaders and technologists are coming together to apply cloud technologies to change their products and how they sell them. For some, digital transformation results in overhauls to core business models. Companies that used to *sell things* find that with the connectivity, the data, and analytics, that they can now sell services instead.

Selling industrial equipment a mere half-century ago was a relatively simple thing. A company would purchase the equipment, be it manufacturing machines, hydraulic pumps, or magnetic resonance imaging (MRI) devices, for a fixed cost and then depreciate that cost according to accounting rules over a period

of years. This of course required a one-time large capital expenditure, which would likely have to be repeated after the end of the depreciation period.

But in a highly connected world, new models are available.

## Rolls-Royce

Rolls-Royce has more than 13,000 engines for commercial aircraft in service around the world, and for the past 20 years, it has offered customers comprehensive engine maintenance services that help keep aircraft available and efficient. As the rapidly increasing volume of data coming from many different types of aircraft equipment overtakes the airlines' ability to analyze and gain insight from it, Rolls-Royce is using the

Microsoft Azure platform to fundamentally transform how it uses data to better serve its customers.

Worldwide, flight delays and disruptions cost the airline industry millions of dollars every year. Even a small reduction in "aircraft on ground" (AOG) time can translate into a significant amount of money, so airlines are always looking for ways to improve the efficiency of maintenance activities.

The same applies to fuel costs. Fuel generally accounts for a whopping 40 percent of airlines' operating expenses. Even a 1 percent optimization of fuel consumption can save an airline millions of dollars annually. A lot of factors affect how much fuel is consumed on a flight, including the flight path selected, weather, engine efficiency, and operational choices such as how much fuel to carry on each flight. The heavier the fuel load, the more fuel the aircraft will burn. A clean engine burns less fuel, but washing engines is time consuming and expensive. Determining when the optimum time is for each of the engines in a fleet to get washed requires the analysis of a lot of data.

In fact, all the choices that affect operating costs and efficiency across an airline require an enormous amount of data analysis, but sorting out which information matters is becoming more difficult as technological advances unleash a rapidly increasing barrage of data. An engine 15 years ago had very few sensors and generated a small amount of signals and data. Today, each engine has many sensors and generates thousands of signals, with a corresponding increase in the number of data points produced. As a leading provider of aviation engine services, Rolls-Royce examined these growing data analysis challenges and emerged with a plan to address the changing market with a more compelling set of services to meet the broader needs of the marketplace.

## Leading the industry with services

Across its history, Rolls-Royce has manufactured some of the world's most respected aircraft engines—from its first Eagle engine in 1915 and the Merlin engines that helped Allied aircraft fly to victory in World War II, up to today's top-of-the-line Trent series engines that power aircraft including the Boeing 787 and Airbus A380, A350, and A330neo.

Yet in the commercial airline industry, it isn't just Rolls-Royce's premium engines that customers value. About 20 years ago, Rolls-Royce went from manufacturing and selling engines to extending comprehensive maintenance services to the airlines that use its engines. The company's TotalCare® Services employ a "power by the hour" model in which customers pay based on engine flying hours. The responsibility for engine reliability and maintenance rests with Rolls-Royce, which analyzes engine data to

manage customers' engine maintenance and maximize aircraft availability. This model has been very successful for Rolls-Royce and has created relationships in which airline customers increasingly rely on the company to provide information that optimizes the costs and scheduling related to engine maintenance.

Now, Rolls-Royce has recognized an important opportunity to expand the services it offers by providing meaningful insights across more of the airlines' operations. "The market and the customer need have become much broader as aircraft and engines have gotten more talkative and the scope of our services has increased. There are terabytes of data coming from large aircraft fleets, with gigabytes per hour—rather than kilobytes—to process and analyze," says Nick Farrant, Senior Vice President, Rolls-Royce. "Just managing all

this data is driving us into different areas, but it also gives us opportunities to solve different problems through machine learning and analytics. We can use data and

insight in new ways to refine our customers' operations to add more value to them and allow them to do more with less."

## Filtering the signal from the noise

To bring its vision of a powerful and scalable data analytics system to life, Rolls-Royce chose to build it on the Microsoft Azure platform. "We realized early on, as customer and engine data volumes increased, that we were looking at a big-data problem," says Richard Beesley, Senior Enterprise Architect Data Services, Rolls-Royce. "We quickly concluded that a cloud platform like Azure was a ready-made solution for us."

Beesley explains, "With Microsoft, it isn't just about the infrastructure, it's end-to-end and global. There are the skills, the capabilities, the service offering, the development environment, the security. It all just fit together." Once Rolls-Royce started to collaborate with Microsoft, it began to develop a number of new capabilities using an expansive set of Azure platform services.

Starting with Azure IoT Suite, Rolls-Royce will be able to collect and aggregate data from disparate and geographically distributed sources at an unprecedented scale. "With the increase in the volume and velocity of data that we're looking at, Microsoft Azure IoT Suite will have a key part to play in our ability to reliably aggregate data across our customers' fleets," Beesley says. Initially, the types of data being processed include snapshots of engine performance that the planes send wirelessly during a flight, massive downloads of comprehensive "black box"-type data, technical logs, and flight

plans as well as forecast and actual weather data provided by third parties.

Using Microsoft Cortana Intelligence Suite, Rolls-Royce will be able to analyze a rich set of data and perform data modeling at scale to accurately detect operational anomalies and help customers plan relevant actions. Farrant says, "Microsoft Cortana Intelligence capabilities are helping us filter the signal from the noise across large data sets so we can focus on finding the real value in the data. Our vision of future digital capability will need to aggregate many sources of data and provide a platform for collaboration with customers."

Michael Chester, Product Manager Data Services, Rolls-Royce explains, "By looking at wider sets of operating data and using machine learning and analytics to spot subtle correlations, we can optimize our models and provide insight that might improve a flight schedule or a maintenance plan and help reduce disruption for our customers."

For example, aircraft and engine components, such as a fuel pump, often have a "soft life"—the point at which it is recommended to remove it for maintenance based on its time in operation. By analyzing detailed data from each specific pump and comparing it to data models and other pumps in the fleet, it is possible to provide an alert that indicates that a specific pump might not be performing

well and should be replaced sooner than its soft life. Conversely, if a pump is close to its soft life, but monitoring and analytics show that the performance is normal, a decision could be made to defer until a later, routine maintenance window. Moving to an approach based on components' actual condition could potentially add up to tremendous savings across a fleet by minimizing the disruption and cost of maintenance. "We see emerging digital technologies and robust prognostic analytics allowing us to work with customers to realize these types of opportunities" Farrant says.

In expanding the scope of services Rolls-Royce offers its customers, fuel efficiency is one of the first and highest-yield areas that the company is targeting. By analyzing new data against existing forecasts, reference tables, and historical trends, Rolls-Royce will be able to help airlines understand exactly which factors—including flight plans, equipment maintenance, weather, and

discretionary fuel—have the most impact on fuel performance. "By blending all these data sets, we can provide more targeted and actionable insights at the point of need to inform the decisions that optimize how the airlines go about doing business," says Chester.

All of this requires a massive level of scalability that is greatly facilitated by employing a wide range of Azure platform services. From using Azure Data Factory for orchestration and Azure HDInsight for high-level data aggregation and summarization, to using Azure SQL and Azure Blob Storage to handle all the different types of storage needs, Rolls-Royce is taking full advantage of the integrated Azure platform services. Beesley explains, "The Microsoft Azure platform makes it a lot easier for us to deliver on our vision without getting stuck on the individual IT components. We can focus on our end solution and delivering real value to customers rather than on managing the infrastructure."

## Delivering insights to the right stakeholders, at the right time

Helping Rolls-Royce's customers understand the value of the data analytics initiative is vital to the success of the project, and Microsoft Power BI has played a critical role in those efforts. "In the past, building our own chart and dashboard tools was laborious, and it really slowed down some of our product development," Beesley says. "With Power BI, we can very quickly and easily create reports and dashboards that tell quite a compelling story."

Rolls-Royce foresees that by gaining access to wider sets of operational data, it will be able to offer more valuable services to

customers. Another important benefit is that the company will gain a better understanding of how it should structure its support contracts, how it can better manage risk, and what its product development needs are.

"There's no lack of data in our market today. We and our customers are drowning in data, and many existing systems struggle to filter the signal from the noise and offer the means to analyze things in a consistent way. Our heritage and focus have been intelligent systems linked to engineering knowledge and designed to provide high-quality information and insight. Digital

technology and analytical insight deliver a real, sustainable advantage in the services we provide," says Farrant.

He continues, "Our goal is not data for the sake of data, but to embrace the cloud and analytical technologies to deliver more expert insights to the right stakeholders at the right time. If we can do that and link new digital capabilities into our services, we can collaborate more deeply with our customers and solve many more of their problems, as well as improve execution in our own business."

Although Rolls-Royce's vision for its new,

digitally enhanced TotalCare Services is still in its early stages, there is compelling evidence that the aviation industry is ready to embrace it. According to the PwC Global Airline CEO Survey 2014, 71 percent of airline CEOs reported that they are developing future strategies or have concrete plans for making changes to their data management and data analytics. With highly scalable and sophisticated data analytics services built on the Azure platform, Rolls-Royce's plan to use data to improve the reliability and efficiency of air travel has already taken off.

## Envisioning a solution

Here is an envisioning of reports that could be deployed at an airline.

Operations Engineers at major airlines, responsible for a fleet of aircraft, must constantly weigh the cost and disruption of ad hoc maintenance against the risk and even higher cost of technical failures.

The report in this solution provides an overview of the fleet's status, as well as a summary of predictions for near-term changes to the fleet's technical health. The predictions are based on multiple machine learning models and use the aircrafts' Quick Access Recorder (similar to the Black Box) along with other data sources. The report

shows a detailed output from one of the contributing machine learning models, which predicts the remaining useful life for critical engine components.

The report is visually rich and provides an overview of the flight plans and locations to help decide where an aircraft should be serviced and which other aircraft is best positioned to replace it. The report also includes a custom Sankey chart to rationalize the fleets' different KPI weightings based on the types of airframes and a striking 3D heat map in the shape of a jet engine. These visuals provide insights in a manner that is intuitive to those working in the airline industry.

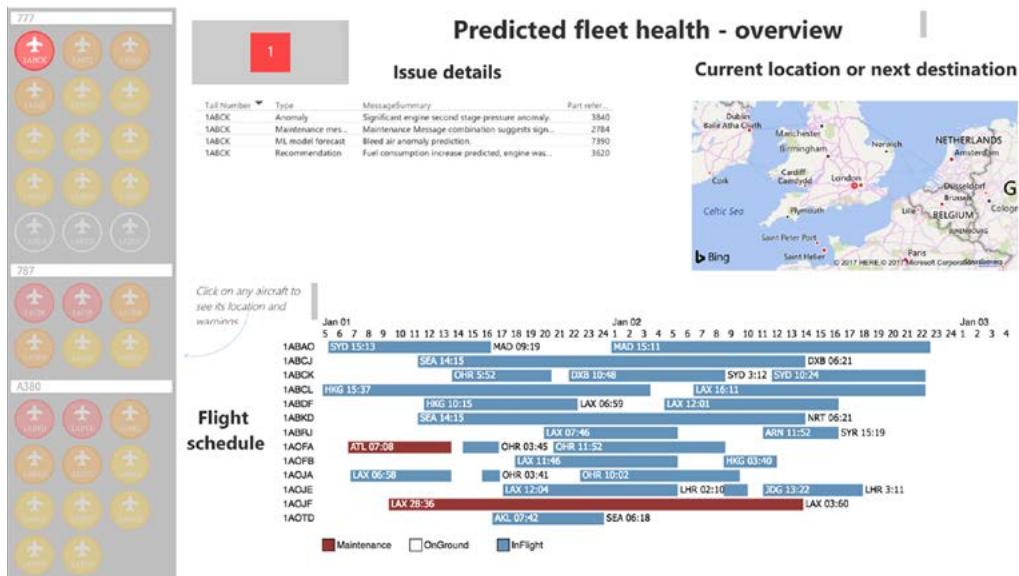


Figure 8-1 Predicted fleet health

This set of reports is built with Microsoft Power BI, and draws information from a variety of data sources. The first page (above) shows a listing of the aircraft by type and tail number, their locations, and mechanical issues for each.

Another chart, below, depicts how various potential expenditures will affect key performance indicators (KPIs) for the airline (this is called a Sankey chart, after its creator, Captain Matthew Sankey).

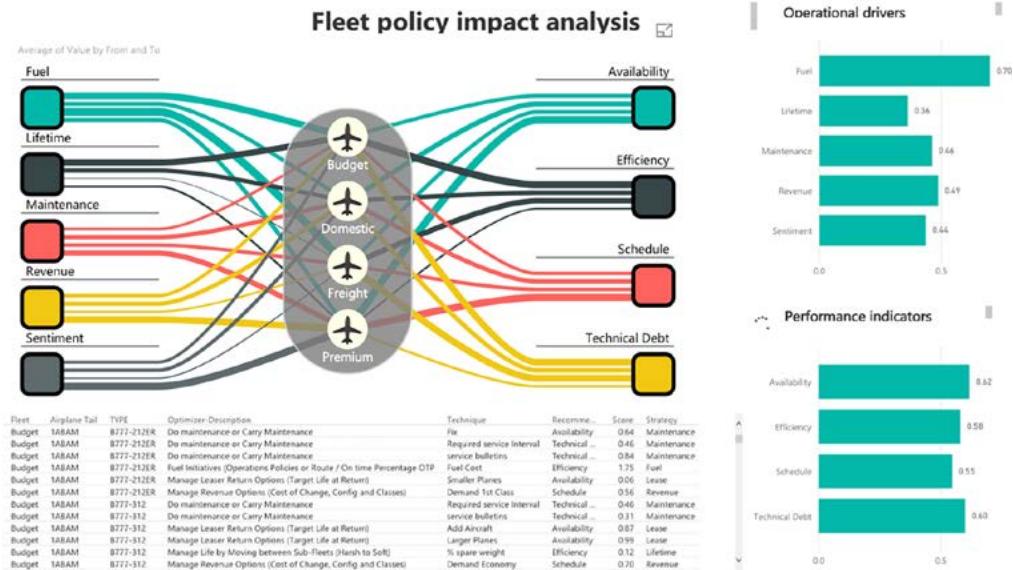


Figure 8-2 Fleet policy impact analysis

Similarly, data collected over a period of time on particular engine types can be used

to predict the useful life of an engine or its parts, as shown in the chart below:

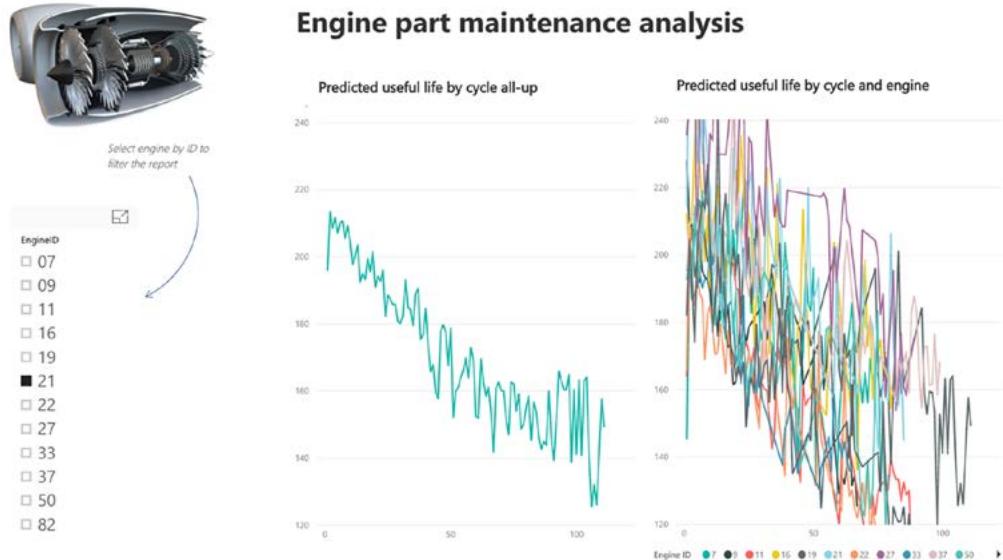


Figure 8-3 Engine part maintenance analysis

In the chart below, the user can hover over each individual part in the engine and see what

faults have been reported, and all issues are summarized in the table to the right.

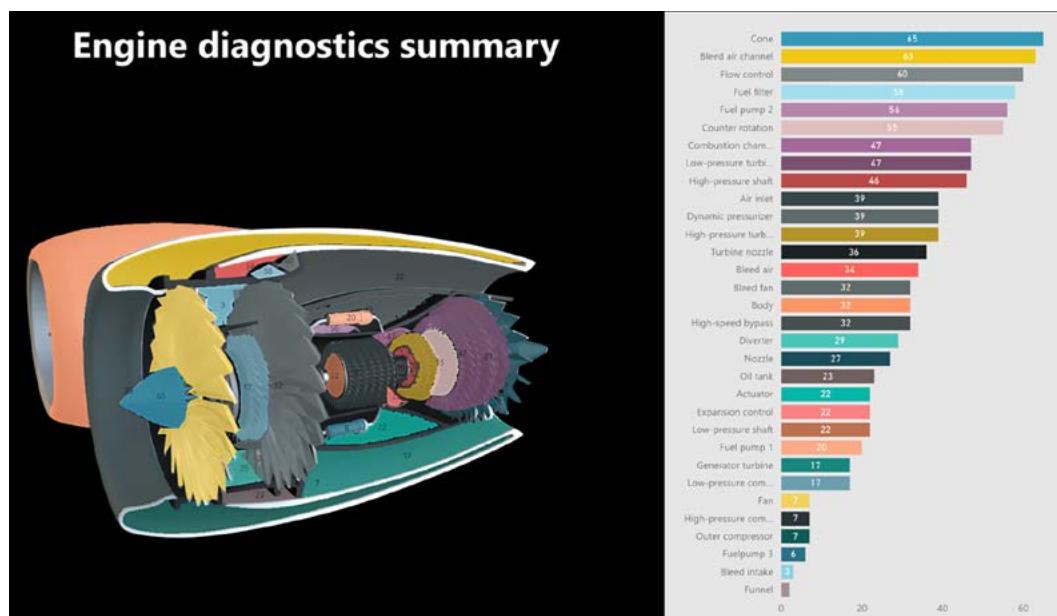


Figure 8-4 Fleet policy impact analysis

You can see these envisionings live at the Microsoft Power BI web site

(<https://powerbi.microsoft.com/en-us/industries/airline/>).

## Johnson Controls

In 1885, Johnson Controls invented the thermostat, a simple device which controlled the temperature of a room. That was a transformative invention, one that a century and a half later has found its way into nearly every modern building.

Today, Johnson Controls is a leader in building environments that deliver energy savings. Today, Johnson Controls, like many other companies, is using the power of connectivity through the cloud to improve their operations.

Here is an interesting and important fact: Some 47% of global energy is consumed by buildings—with about half of that coming from air conditioning chillers.

To ensure maximum efficiency, Johnson has created the “smart chiller,” a product which uses the internet to enable technicians to monitor their performance 24x7. Technicians using mobile devices can keep track of chiller data from anywhere and respond at the first sign of trouble.

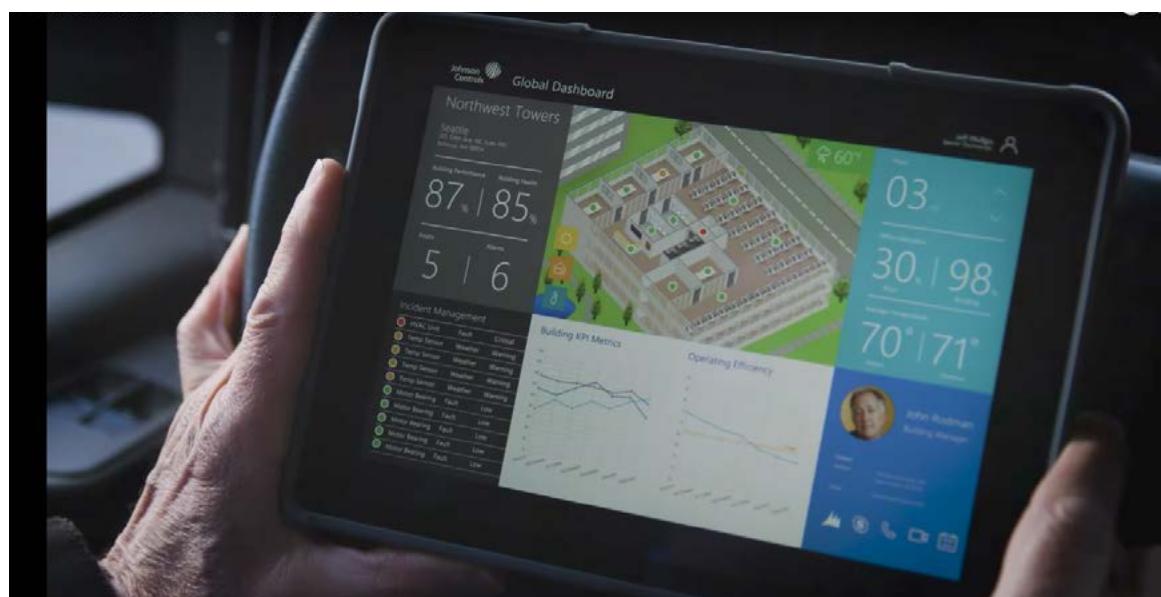


Figure 8-5 Johnson Controls mobile interface

This capability has important ramifications. Maintenance can now be performed proactively, as technicians recognize potential trouble indicators. Proactive chiller maintenance can save millions for non-profit institutions such as colleges and universities. Preventing a failure can keep a manufacturing line operating and eliminate

downtime. An operating room at a hospital at the wrong temperature can delay a procedure.

This means, as in the Rolls-Royce case above, that downtime can be minimized or eliminated. Costs are reduced, and customers are happy.

## Changing your business model is a win-win

In fact, customers can love your product because by taking care of their product, you are, of course, taking care of them.

Now, let's review what we've learned. At Rolls-Royce, they're using telemetry data from their engines, along with other data, along with advanced analytics, to keep

the planes flying. At Johnson Controls, similarly, they're monitoring their products and applying maintenance before a failure occurs. In both cases, they're providing their products, effectively, "as a service" rather than as things. This business model is only possible because of the cloud.

## The connected cow

When we think of the Internet of Things, we usually conjure up images of mechanical devices connected to the internet, supplying telemetry and receiving commands. But SCR Dairy is connecting farm animals to the global network as well.

SCR Dairy's "cow intelligence" program HealthyCow24 places inexpensive neck tags on each animal, enabling farmers to monitor livestock health and take preventative action. The tags come with motion sensors and microphones that monitor the cow's activity

and rumination levels. Each tag returns data to the cloud to help farmers boost milk production, smooth the calving process and ensure healthier cows.

And this, says farmer Steffen Hake, saves time:

*"To identify a cow in heat, we used to have to spend at least 20-30 minutes in the stables, four to five times a day. This time has now been eliminated."*

The system aggregates data from the sensors and conveys it to the cloud. Farmers can then access information about cows' heat cycles and health anywhere from their office to the field, using a mobile app. Farmers can also make lists, prepare reports, sort cows by category and track each animal's history.

SCR Dairy now has about 4 million tags connected to cows around the world, monitoring their activity and well-being 24 hours a day. The data generated from the tags is transferred to management solutions that help farmers make better decisions, as well as providing alerts.

## Land O'Lakes

Land O'Lakes, based in Arden Hills, Minnesota, is one of the largest farmer-owned food and agricultural cooperatives supporting the "farm to fork" industry. For it, and its members, finding ways to use technology to increase yields is not only important, it is vital.

As Michael Macrie, SVP and CIO of Land O'Lakes, wrote in a recent blog post:

*You probably know Land O'Lakes as a famous brand of butter. What you may not know is that it is also a \$13 billion company that includes our Land O'Lakes dairy foods business, our Purina animal feed business and our WinField business, which focuses on crop inputs (such as seeds and nutrition) for precision agriculture.*

*Our cooperative includes more than 4,000 member-owners, including direct agriculture and dairy producers and independently owned and operated ag retailers. These retailers operate thousands of locations across the United States, with approximately*

*300,000 farmers in their system representing close to 100 million acres.*

*We process and distribute their dairy products, supply them with animal feed and crop inputs, and help them run their farms more productively. It's all part of our overall goal to feed the world in the most sustainable way possible, and we're doing it by embracing cloud, big data and mobile technologies.*

*Historically, technology has had a profound impact on increasing agricultural yields and on-farm productivity. First, the mechanized revolution introduced the tractor to American farms in the early 1900s, then the biotech revolution helped us develop seeds that resisted pests and diseases from 1950 through today. Now, we're moving into the AgTech revolution—applying computer science and technology to the planning, planting, growing and harvesting of our*

*crops. In 1940, a single farmer fed about 19 people. In 2012, that same farmer fed 155. Technology has enabled one of the greatest productivity stories of our generation and resulted in lifting millions out of hunger by reducing the cost of the food we eat.*

*Today, Land O'Lakes is one of the largest distributors of AgTech to farmers in the United States. We provide both proprietary and third-party applications to our members to help them optimize their production and output while minimizing their inputs, all in the most sustainable way possible. For example, we are now migrating our WinField R7 application to Microsoft Azure to help us scale beyond the millions of acres we actively manage today. This app takes a vast array of agronomic research, weather information and satellite data and puts it together on a mobile device for farmers—and the WinField specialists who help them—so they can make important planting decisions and react to real-time changes in the field, every day. And that's just one example of our company-wide investments in the cloud and our strategic relationship with Microsoft.*

*In our Purina business, we are combining over 70 years of proprietary feed research data with new sensor measurements and capabilities coming from the Internet of Things and the Cortana Analytics Suite on*

*Azure. These new tools and technologies will allow us to shorten the time it takes to bring new products to market. In our dairy business, we are looking at ways of leveraging big data and predictive analytics to determine and alter the production of butter, cheese, powder or milk, in order to create the most profit for our member farmers. Lastly, we have invested in the success and productivity of our employees and co-op members with wide-scale use of Office 365 and Surface tablets. It's hard to imagine a more mobile workforce than farmers, and now they can analyze data and plan together with our reps, all while standing in the middle of a field.*

*These efforts are just the tip of the iceberg when it comes to Land O'Lakes' work with Microsoft and our commitment to technology and leading the AgTech revolution. We have truly transformed how we work and serve our cooperative members, and the benefits are clear to our business and our mission to feed human progress. Yet, we are just beginning. I look forward to sharing more about our journey and progress in this rapidly changing marketplace in the future.*

## How you can transform to thrive

Many now say that “every company is becoming a software company.” What would such a transformation mean to you? How would the nature of your products

and your business model shift? Would your gross margins shift from “things” to services delivered because of digital technology?

# Chapter 9.

# Using digital technologies for good

When a natural disaster occurs, things happen fast. You've entered a "new reality," says Lewis Curtis, director of Microsoft Services Disaster Response.

New computing technologies like the cloud are making it possible to quickly respond to a disaster, coordinate the response by governments and aid organizations, provide analytics to better understand and track its impact, and manage the aftermath. All of the same technologies and innovations

that enable businesses to quickly respond to new opportunities and changing market conditions make the cloud an essential part of any disaster response.

The essence of the cloud—the ability to stand up servers and databases in minutes or seconds, the rapid application development capabilities we've seen in previous chapters, its global reach—make it a natural part of any responder's toolkit.

## Oso, 2014

On March 22, 2014, a hillside saturated by heavy rains collapsed on the small town of Oso, Washington, flattening homes and killing 43 people. In the aftermath, nearly 200 government and aid agencies, including the Red Cross, the Federal Emergency Management Agency, the Washington National Guard and the U.S. Navy's search and rescue team, as well as thousands of representatives of the media, descended upon the town.

The local government's record-keeping and coordination systems were quickly overwhelmed.

In response, Microsoft Services Disaster Response, with help from the Azure product team, migrated Oso's records to the cloud. With its nearly limitless capacity, the cloud made it possible for everyone who needed access to the records to retrieve and search them quickly and efficiently. Using Office 365, they also quickly deployed an Incident Command Collaboration System that enabled incident commanders and emergency liaisons from the various agencies to connect with one another.



Figure 9-1 Oso first responders

## Nepal, 2015

A year later, a massive earthquake leveled some 600,000 buildings and killed thousands of people in Nepal, leaving the remote, mountainous country facing the massive task of rebuilding. “Disaster relief is always overwhelming,” Dan Strode, project manager for the United Nations Development Program (UNDP), said at the time. “There’s too much to do, too many people that need help, and never enough time or resources.”

The daunting task of rebuilding began with mapping where the original structures

had stood. In the past, such records were maintained on paper. However, in order to expedite reconstruction, the Microsoft Innovation Center in Nepal built a mobile phone application that used a device’s GPS to help workers record the outline of a damaged home and store it in the cloud before clearing the debris. To help restart the economy, the app also managed daily cash payments to the workers. Cloud applications like Office 365 and the data visualization tool Power BI helped them coordinate and track progress.

## Ecuador, 2016

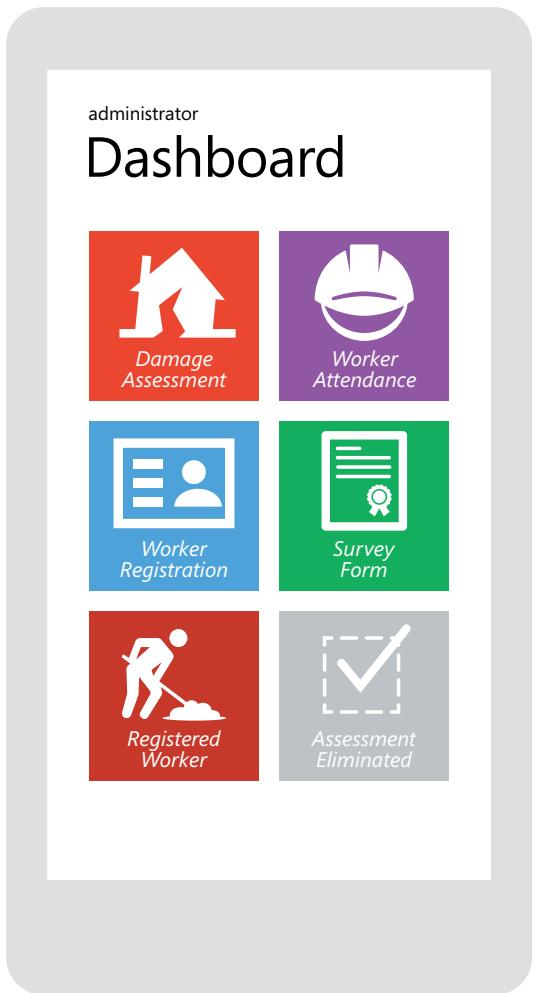


Figure 9-2 Nepal's debris management application

In April 2016, when a magnitude 7.8 earthquake ravaged western Ecuador, the government needed a basic software application to register those affected, and ensure that shelter, food, and medical supplies reached the 2,300 families left homeless by the disaster.

Neighboring Colombia had such an application, but could it be quickly moved to Ecuador and get up and running? In short, yes. Within a week, it was redeployed to the Azure cloud. The Ecuadorian Red Cross also used the cloud to manage volunteers and blood bank data across the country.

## Louisiana, 2016

Only a few months later, in August 2016, Baton Rouge, the capital of Louisiana, was inundated by record rains. Four feet of floodwater destroyed not only a million pounds of food held in reserve at the Greater Baton Rouge Food Bank, but also all of its computer systems. These had been used to track supplies and who received them, ensuring that hungry people were getting the food they needed.

Quickly moving their office and warehouse management applications to the cloud guaranteed that those applications would always be available, and that the loss of their systems “would never happen again,” says Michael G .Manning, president and CEO of the Food Bank. With cloud-based applications, the food bank could “operate anywhere, at any time, in any future disaster.”

# Count on the cloud

We included this chapter to drive home a point. If disaster response teams can count on the cloud, you can too. As Lewis Curtis notes, there are typically three activities requiring computing support that have to be established as soon as possible after a disaster:

- *Collaboration.* There are often dozens or even hundreds of government agencies, non-governmental organizations (NGOs), and relief organizations on site, whose activities must be tracked and coordinated. Cloud-based software such as Office 365 can be quickly stood up to ensure the most effective use of all these resources.
- *Communication.* The ability to communicate is of paramount importance, whether it's for victims to find their families, for

governments to get the word out about where and how to apply for assistance, or how to contribute to victims' funds.

- *Analyze.* Equally critical is knowing what's going on in real time, by examining the data as it comes in; for example, to track the progress of an Ebola epidemic in Africa, or to distribute funding and aid to those who need it most.

What aid agencies and governments are finding so useful about the cloud, machine learning, and other emerging technologies are the elements of resilience, time to market, scale, and agility—and these are all qualities equally essential in today's rapidly changing business world.

# Chapter 10.

# Learnings from our experiences

We've learned a lot from all these examples of ideation and digital transformation. Above all, the most important lesson, and indeed the most critical imperative for this new era, is speed matters. In the hypercompetitive environment we now find ourselves in, everyone is innovating, and the prize will go to that organization that arrives on the market with the right product first.

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Fortunately, we've also seen that it's possible to come up with truly revolutionary ideas in very short periods of time—days, or weeks. The cloud provides huge bundles of reusable technology—machine learning, IoT, dashboards, and big data, to name a few—that you can easily connect your existing applications and data to, to try out new things.

But as we discussed at the top of this chapter, it's much more important to focus on the what—your business strategy, your business processes, your business goals—than the how. Focusing on the what allows you the freedom to survey the technological landscape and select what you need to achieve your vision.

With so many new channels, with so many new modalities with which to connect to customers, partners, and employees, it's

no wonder that the very nature of the core models which run our businesses are rapidly changing. At Rolls-Royce, we saw how they collect telemetry from jet engines and use that—just like they do at Johnson Controls—to proactively maintain these complex machines. For the customer, it means vastly increased uptime, and for the vendor, corresponding improvements in customer satisfaction—and repeat business.

We also saw how new technologies like chatbots can provide an entirely new, more "human" interface for your company to customers. Not only do they talk to us in our native language, but they can also help your users find things quickly and responsively. And with all the data that we are collecting, we can use cloud technologies to build a level of intimacy with each and every customer—or patient—far more than ever before.

For years, we've amassed huge quantities of data, and now we are able to use it: To analyze it, bring diverse forms of data together, find patterns, make predictions. In many ways the cloud revolution is at its heart a data revolution because, for the first time, not only are we able to store all of it, but we can analyze all of it, yielding insights never before possible.

Employees are seeing these benefits too. Sales people in the field always have access to the latest product data and sales programs, and everyone can access their own information through employee portals. As the next few generations, born and raised in the digital era, progressively replace older ones in the workforce, they will increasingly demand this sort of online experience for all of their employee questions and concerns.

Few, if any, corporate data centers can possibly have the global reach of the cloud. From the cloud you can reach mobile devices virtually anywhere on the planet, to make sure your garage doors are closed—or to ensure your sales are on track.

As Dr. Jeanne W. Ross, Research Director & Principal Research Scientist at the MIT Center for Information Systems Research, and doyenne of business computing, notes, "your products can be wrapped up in information, in services, in ways they never could be before," and that is a profoundly true statement. In an age when customers expect there to be online forums for their products, Facebook pages, and hashtags—indeed, when they can rightfully expect to have an online dialog with the product developers—your products have themselves become ecosystems.

## **Part III.**

# **Brainstorming Your Future**

# Chapter 11.

# Dream, design, deliver

Hopefully, we've proven to you that what many are calling the "digital era" has arrived, and that it will substantially transform your business. In this chapter, we begin to describe how you and your company can begin the process of becoming a digital business. Taking a page from Microsoft's Digital Advisory Services, we'll present one way your entire company can rethink its businesses: We call it "dream, design, deliver."

Microsoft's Digital Advisory Services (DAS) works with customers, including their senior leaders, to create aspirational plans that formalize a digital vision. DAS provides tools

to help you build your digital team, and to ensure that the process of digital reinvention continues uninterrupted into the future. After all, it is your future.

## Start with the four pillars of transformation

In Chapter 3, we discussed the four pillars of transformation, and they provide the starting point for creating the roadmap for your digital journey.

Consider how you can use technology to better **engage with your customers**. Can you achieve a thorough understanding of your customer using the ability to collect data representing a 360-view of him or her? Then analyze it and turn it into intelligence and predictive power that can be acted against to constantly deliver personalization at scale ... wherever, however, whenever the customer prefers?

Think about how you can use tools, as Macy's and Microsoft did, to better **empower your employees**. Would their productivity be improved with better communication and collaboration tools? Would information distributed out to tablets and phones give them the answers they need, any time they need them?

How can you use data, connectivity, and the Internet of Things (IoT) to **optimize your operations**? For example, field equipment once isolated and siloed can now be connected on a continuous basis—enabling businesses to shift from merely reacting to events, to responding in real time, or even preemptively.

Lastly, consider how you can transform your products, taking advantage of digital technologies—perhaps even **transforming them into digital products**. If every company was effectively a software or digital company, how would the nature of their products and their overall business model shift? Would their gross margins shift from “things” to types of services delivered because of digital technology?

As you start to consider your goals in each of these areas, think about your current and future business environment, as well.

- Look around: What players are beginning to encroach on your space, and what spaces could you encroach upon?

- How can you make better use of your existing capabilities, perhaps even monetizing them?
- How can you create new revenue streams?
- How can you transform your business model to an “as-a-service” one?
- What technology trends could disrupt your business, and how can you use them to disrupt your industry?

The answers to these questions will form your Book of Dreams—the first step in your digital transformation, because we’ll show you that once you have such a book, you can take the next steps toward turning them into reality.



Microsoft

Figure 11-1 Four pillars of digital transformation

# Use your radar

How do we start to answer these questions?

One way is to use your radar.

Let's take an example: consider for a moment that you're in the logistics industry, getting things from one place to another, perhaps facilitating international trade, or supporting an industry supply chain, or delivering items to a retail customer. You can see that there are social and business trends that either today or tomorrow will affect your business. Today, for example, omni-channel delivery—supporting brick and mortar, web, or mobile e-commerce—is

increasingly important for retailers. As baby boomers age, new forms of delivery—for medications, or preventative care—will arise.

Technology innovations promise to revolutionize logistics: Self-driving (autonomous) vehicles, for example, will have a tremendous effect on the industry.

Logistics supplier DHL looks into all of these every year, and creates a chart they call their "trend radar." It's a great tool for understanding emerging trends and when they might become real enough to require business adjustment.

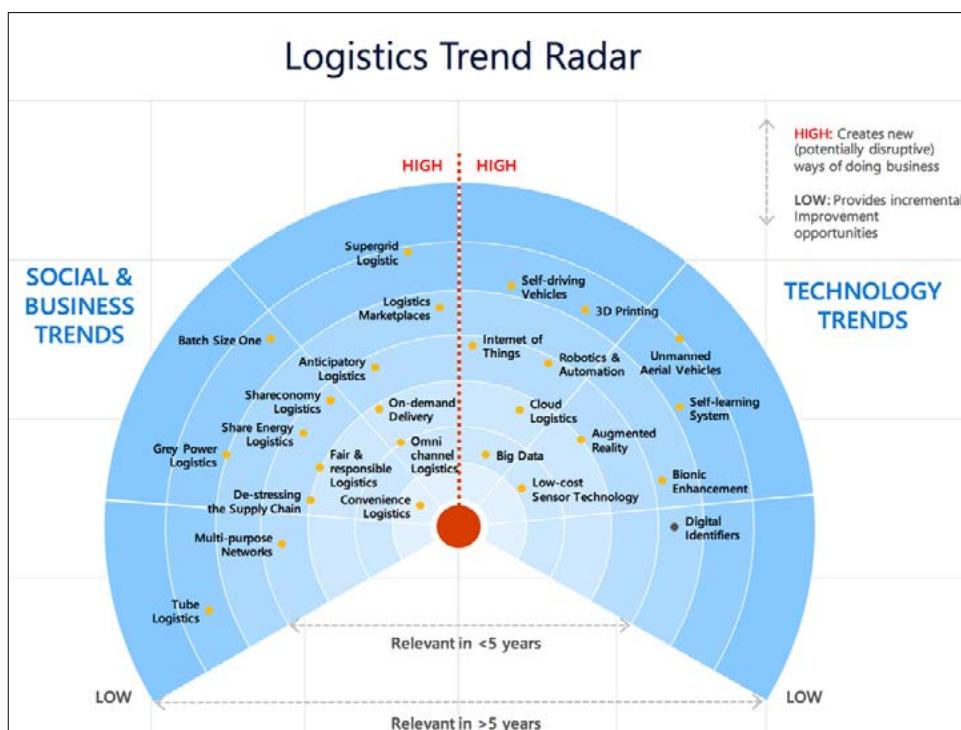


Figure 11-2 Logistics trend radar

# Creating your digital roadmap

Understanding the world around you—social, business, and technology trends—is the first step in becoming what we will call “situational fluency” in the next

chapter. The next step is to take what you’ve learned, and, with your knowledge of your company and your aspirations, build your digital roadmap.

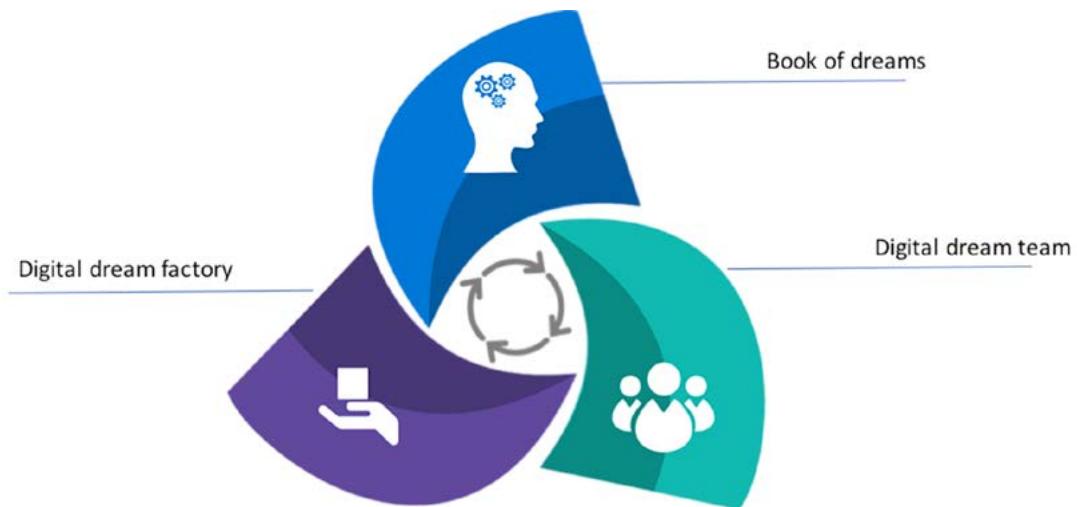


Figure 11-3 Creating your digital roadmap

You start by creating your “book of dreams,” an aspirational view of where your organization can—and should—be after the transformation. Then you’ll take the first few steps in actually realizing your vision

by creating a team to build the roadmap to make it real, and then institutionalize the process by creating an innovation laboratory. Let’s take a look at each step in more detail.

## Build your book of dreams

In creating your book of dreams, you’re really looking at what your company will look like and how it will operate after digital transformation—and not after tactical application enhancements in this quarter or the next.

Begin by looking at industry, social, and technology trends, as we showed above.

Where will your industry be in five years, and how will you want to (re-) position yourself? Ask the hard question of whether your business really can successfully continue in the way that it has to date, or if the indicators you see suggest that a disruption is in the offing.

Think about how your customers interact with you today. One easy way to do this is to construct a “journey map.” Here’s a pretty

typical path that retail customers follow with “pre-digital” vendors:

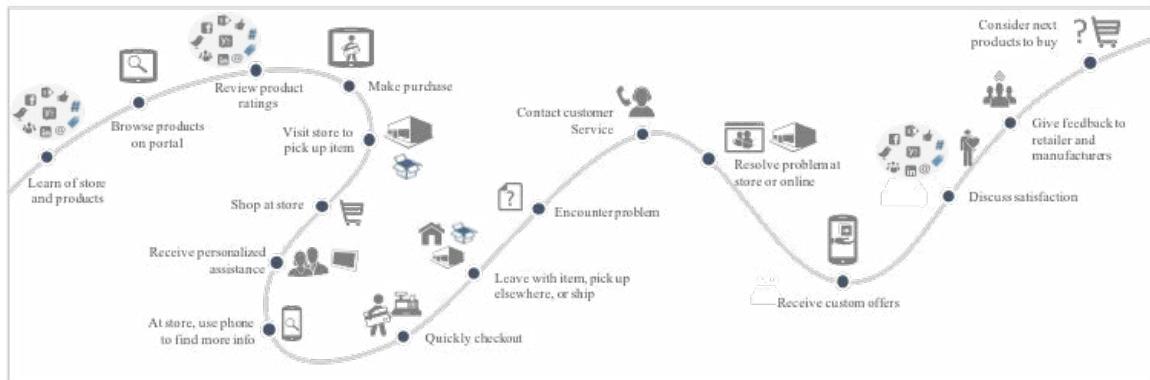


Figure 11-4 Retail customer journey: Pre-digital era

You can see that the customer goes to the store, buys a product, calls customer service when something goes wrong: Certainly not the way things work in the digital age!

But as we all know, this model is not how

customers behave in a digital world. It may be how they deal with your company, but it’s not what they expect.

Here’s an idealized view of how that same retail customer behaves with a “digital” company:

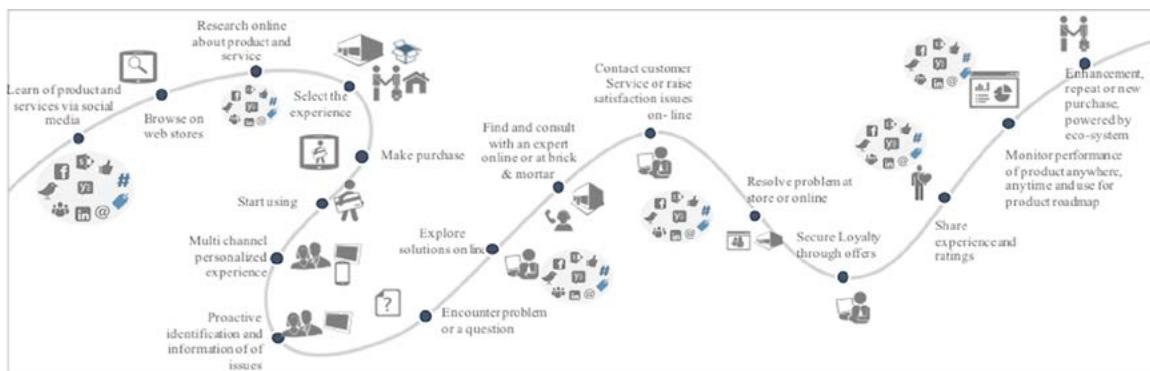


Figure 11-5 Retail customer journey in the digital era

Here, for example, when a problem with the product occurs, the customer goes online, and consults any number of sites to find a solution. The lesson: Perhaps the company should have support professionals monitoring these sites and providing assistance.

These “journey maps” can be very useful for understanding your company—from your customers’ perspectives.

From the journey map, it's a straightforward—and sometimes eye-opening—task to storyboard each individual scenario. Think about (in this example) how customers call support, how long they can expect to be on hold, or whether or not the solution to the issue in question could easily be placed online. Storyboards—as we saw from the Real Madrid story—can be very useful in communicating your vision.

Moving forward, you can now begin to envision what impact this would have on your company, and especially on your bottom line. Perhaps

by providing online help in frequently-visited support sites and forums, you can retrain some of your customer service representatives to perform higher value functions. Perhaps by increasing responsiveness, customer loyalty will improve and you'll get increased repeat business. Or by monitoring online trends you can better tune your products for how your customers are actually using them.

Having envisioned a new digital world for your company, it's time to start to make it real by building a roadmap for the future.

## Recruit and form your digital dream team

That's the job of your digital dream team, a group of forward-thinking individuals, ideally recruited from both your business and from your technology functions. The team has two responsibilities—first, to create the roadmap, but also to provide in more detail the economic justification for the transformation.

A roadmap, very simply, describes three things: Where you are (the "as-is" state), where you want to be (the "to-be"), and how to get there. We'll talk more in succeeding chapters about how to include the right stakeholders and how to conduct ideation and planning sessions: Suffice for now to say that the team is charged with creating an implementation plan which takes into account not only the technological changes

you envision but also the organizational, cultural, financial, and business changes.

For example, you'll want to involve your human resources department as training for new technologies—e.g., a DevOps model of development and operations—are implemented. You'll want to include your finance professionals as you consider new and/or different revenue streams and as your expense models change (say, as you move from a CapEx-based IT to an OpEx, subscription-based model).

As part of the team, consider assigning some of your best technologists to build working, functional prototypes of the new sorts of applications. What will the future look like?

## Build a digital dream lab

As time goes on, you'll want to institutionalize your dream team with one that can continuously ideate, prototype and transform: A "digital dream lab." In the digital world,

transformation never stops: There are always new markets, new business models, new social trends, and new technologies.

Your digital dream lab will continuously

storyboard, looking at both proposed individual project ideas as well as new ways for many applications within your ecosystem to interact in order to provide greater value.

The plan that your dream team developed, you'll realize, is actually a living document, one that will constantly evolve in response to changing conditions, and your dream lab will be the ones maintaining it. They'll be

prototyping and testing new technologies as they emerge, and how they might be used in your environment, and understanding their value and tradeoffs. They'll conduct user research and experiments (such as "A/B" testing) to fine-tune your plans and help prioritize investments.

We'll talk more about creating your lab in Chapter 13.

## Summary

Our view—in case it's not obvious yet!—is that the cloud is such a disruptive technology, potentially affecting every way a company does business, that it's worth stepping back and rethinking your organization's goals and how they are achieved. In this chapter, we presented how Microsoft's Digital Advisors approach this:

By creating a book of your company's dreams, which documents how your company will evolve in the digital era; then, using a group of your company's forward thinkers, planning this grand transition; and finally, as it becomes clear that transformation is never-ending, creating a laboratory where you can continuously innovate.

# Chapter 12.

# Envisioning

So where do you begin? Perhaps you're in IT; perhaps you're in the business; perhaps you lead an organization or even your entire company. Regardless of role, it's important to have, and to use, a framework for envisioning: The first step in using these technological innovations to transform your business. In this chapter, we'll give you some tips and best practices from successful envisioning sessions we've conducted.

Any conversation about business transformation must, of course, begin with the business: Its strategy, goals, and above all, its processes. It's critical that everyone—from IT to business—are level-set on what your company desires to achieve. To get to this mutual understanding, we'll show you how to:

- Understand the "why" of your business

processes using a technique we call situational fluency;

- Understand your business processes' roles, responsibilities, and key activities (the "who" and the "what");
- Envision big ideas and formulate what the success of a cloud technology solution that drives transformational results looks like.

## Understand the business with situational fluency

What do we mean by "situational fluency?"

Situational fluency, simply, is the state of being thoroughly conversant with the business and the goals it has. "Fluency" as we use it is more than "awareness." It involves a deep understanding not just of the tactical problem to be solved, but how it fits into the larger strategy and—in fact—if the problem indicates that the strategy itself must be changed.

With a thorough understanding of your corporation, its business goals, and outcomes, you'll have the basis to critically examine the business processes that service these goals and outcomes or the business problem that is preventing us from attaining a current goal or a newly established goal. And, through envisioning, you'll quickly see when it may be possible, or necessary, to disrupt what exists in favor of something new.

Here's an example of situational fluency in a different context. If you were the coach of a sports team, and you wanted to have situational fluency for a big game, you would watch videos of your own team's recent games. You would try to understand what aspects of your team's play is working well, and what isn't. You'd pay closer attention to

some players than others, seeing them as essential keys to success. You'd also watch videos of the competition, analyzing their team play as well as individual player strengths and weaknesses. And then, during game time, based on this situational fluency, you'd adjust your game strategy and game play accordingly.

## To achieve situational fluency, do your homework

The key to situational fluency is preparation, by taking a "business before technology" approach. To gain situational fluency, you need to understand, first and foremost, your company's strategy and desired outcomes.

Many companies and organizations use strategy maps and/or balanced scorecards (techniques pioneered by Robert S. Kaplan and David P. Norton) to document strategy, the initiatives they have to achieve them, and the KPIs used to measure progress. Use these to help prepare you for your ideation session.

If your company or organization does not have strategy maps or scorecards, consider a preparatory session to build a SWOT (strengths, weaknesses, opportunities, threats) analysis

to gain more understanding of what works and what doesn't. As you learn about your existing business processes, pay attention to the goals they are measured against, the process' internal stakeholders and influencers, any commonly acknowledged problems or pain points, and the roles, activities, and responsibilities involved with the process.

And, as we discussed in the previous chapter, look outside your company for emerging business, social, and technology trends that could influence or even disrupt your business. You may discover that the process you want to incrementally improve needs to be replaced; or even that the business model it supports may soon be made obsolete.

## Diving deeper

As you become fluent with your company or organization, you'll be able to clearly articulate your company's strategy, primary goals, and stated objectives—making you a key resource for the ideation session. But you'll need to go deeper to fully appreciate where your opportunities are.

The layers to explore include:

- Where your innovators and thought leaders are;
- The extent to which your company has begun its use of the cloud;
- Your company's organizational dynamics, culture, and readiness for change;

- Ongoing initiatives;
- Current state of your IT technology;
- Relevant compliance and regulatory constraints.

## Who are your innovators and thought leaders?

As part of your preparation, compile a list of who your innovative thinkers and thought leaders are. Often, these individuals will form your digital “dream team” that we described in the previous chapter and will

be the core of the innovation laboratory that you’ll create. Look beyond the current management layers—often the innovators are individual contributors.

## Is your company in the cloud?

Most companies by now have taken advantage of the cloud to some extent, and many have begun the migration of on-premises applications and functions to the cloud. However, in many cases, organizations see the cloud purely as a way to save money on hosting costs by eliminating data centers—a view which is not incorrect, but

one which greatly limits the potential value of the cloud for business. With your digital dream team, learn about the ever-expanding number of services available in the cloud—machine learning, IoT, or analytics, to name a few—and begin thinking about how these might provide entirely new capabilities and revenue streams for your business.

## Is your organization ready for change?

On your path to situational fluency, you’ll want to become intimately familiar with your company’s internal organizational dynamics, the company’s people and leadership, and the way people function in your organization, driven by its culture. It’s often said that “culture eats strategy for lunch,” (a phrase commonly attributed to business guru Peter Drucker) and—in our experience—truer words were never spoken.

Evaluate your organization’s readiness for change. In many organizations there is an inherent reluctance to accept change, often

for important reasons: Perhaps previous change initiatives failed (and hurt careers as collateral damage); or regulatory risk is perceived as too great a blocker to change; or there is a lack of expertise around new technologies. You’ll want to understand these issues so that as you proceed through ideation you and your team can come up with ways to mitigate them.

On the other hand, many organizations, recognizing that change is always ongoing, actually have a person or team whose function is managing change: They are your allies.

## Are there already initiatives under way that can help you?

Become aware of your company's existing strategic business and IT initiatives. Frequently, funding for new transformational projects can get jump-started by aligning with existing, already-funded initiatives. Don't just focus on IT; become familiar with strategic initiatives throughout your organization.

For example, there might be company-wide initiatives related to business agility through "modernization" or "serving customers better" that your initiatives could become a part of, fast-tracking both funding and internal support.

## Understand your "as-is" technology story—in IT and elsewhere

As part of your "homework," you'll want to familiarize yourself with the state of technology in your company. In IT, applications or systems need to be retired based on a lack of support, or sunset because they are going to lose support soon. These applications are typically relegated to "keep alive" or "maintenance" initiatives and may be prime candidates for technology on the horizon. You'll also want to gain an appreciation of what is often called "technical debt." That is, old applications, outmoded networking techniques, or quick fixes that remain because the cost to replace them has generally been perceived to be too high: again, candidates for replacement in the cloud.

Gauge the comfort level of the IT department with evolving, extending,

or replacing foundational technologies. Who gets involved in such projects? How have they gone about it in the past, and what were the results? Do particular technologies or platforms have advocates? If so, get to know these people and find out what they think about the strengths and weaknesses of your core technologies and how they support the business. Also ascertain their interest in evolving — or revolutionizing — forward.

Also, you should survey the landscape of so-called "shadow IT," systems and applications managed outside of IT. Often business units are the first to deploy cloud solutions, especially SaaS services, because of their low cost and lack of need for IT management.

## Compliance and regulatory constraints

If you're in a highly regulated industry, make sure you learn the ins and outs of your company's compliance requirements and the compliance systems in place. Do compliance issues relate to all your key business processes, or just some? How challenging and problematic is compliance, and who in the company does it most affect?

Consult with your risk and compliance officer

to determine which business processes have regulatory constraints, such as the Payment Card Industry Data Security Standard (PCI-DSS, for credit card transactions), the European General Data Protection Regulation (GDPR, for protecting individual privacy), Health Insurance Portability and Accountability Act (HIPAA, for health care), or any others.

You don't want to waste any time ideating in directions that compliance constraints won't permit. You also will want to plan how to most effectively meet compliance and

regulatory requirements with any solutions you ideate and build, so become familiar with critical compliance information upfront.

## Candidate opportunities for transformation

It is now time to reflect on the information you have gathered and see if any candidate opportunities for transformation exist. You want to determine where the biggest potential gains would be. Use the following guidelines to establish a list of where to find the best opportunity candidates:

- Disruptive opportunities: Businesses that are facing disruption from external social, business, or technological forces;
- Optimization opportunities: Business units that need greater agility, efficiency, or productivity; or have emerging requirements such as new compliance issues, new markets as they globalize, or are migrating to the cloud.

## An envisioning session to start your transformation

You did your homework and followed up by investigating selected candidate opportunities. It is now time to conduct the envisioning session in which you'll perform, in a structured way, ideation. Ideation is coming up with ideas, but it is more than just that. It must evaluate those ideas systematically against a pragmatic backdrop of available, attainable, or horizontal resources to flesh out their value.

It's time to utilize your situational fluency to work with your company's key business process stakeholders and envision what a cloud-based transformational solution, or set of solutions, would look like. The next few sections describe the envisioning session, which provides a platform for an interactive discussion with your company's business process and technology owners.

### Setting expectations

The purpose of the envisioning session is to drive big ideas, confirm business goals, understand business processes, and

identify opportunities to use the cloud and other technologies to transform the business. Ultimately, you'll identify ideas

with significant transformational potential to enhance and perhaps revolutionize the business. Through envisioning, you'll paint a picture, with appropriate framing, detailing what transformational success would look like for the business. And you'll build trust and cooperation with your stakeholders.

## Participants

Ideally, a range of people with different strategic, operating, and tactical perspectives surrounding the candidate opportunity should participate in your envisioning session. Make sure to include your thought leaders, the core of your digital dream team,

One or more advance meetings with strategic partners may be needed before the envisioning session to discuss the "why" of the envisioning session, its intentions, and its expected outcomes. Gaining such advance acceptance is not always a requirement, but it can be helpful and sometimes necessary.

and invite your strategic leaders (C-Suite, VPs), business directors (mix of strategic and tactical), technology managers (mix of strategic and tactical), and change management and front-line staff (tactical) as well.

## Duration

For most sizable efforts, assure you have at least one full day for your envisioning session to give you the time to build trust and cooperation with the people involved.

Typically, an envisioning workshop should not last more than three days. Our sessions are generally one, and preferably two-day sessions.

## Agenda

The basic envisioning session is iterative and agile. A session consists of framing the situation, reviewing key issues using your business process situational fluency, validation of the information you collected and your initial insights, identifying next steps—or problems limiting progression to next steps—and, finally, identifying opportunities for transformational cloud solutions.

The steps outlined are not necessarily done in this exact sequence. The context of the discussion throughout the session should guide your choice of which step to use when. Framing the situation is the starting

point, but circumstances may require you to subsequently jump to any of the other steps or back to framing the situation as needed.

Each activity identified in the envisioning session—framing the situation, validating situational fluency, identifying activities and roles, problems and opportunities—should be written in public view of the audience in the room. This achieves a consensus of the information by those who are in attendance and gives them information to go back to their organizations with, if necessary.

While we recommend that you take responsibility for documenting those statements

needed for framing the situation, it can be helpful if other people are assigned to collect information and take notes for the other four activities during the entire envisioning session. Consider using a room with four separate white boards or flip charts and

assign different participants to make notes on the whiteboards. Ask them to take responsibility for documenting all the notes during and after the session is complete. This helps engage people and keeps the process participatory and interesting.

## Framing the situation

After initial introductions and an overview of the agenda for the envisioning session, you should take the opportunity to frame the situation your company is currently in. In a few thought-out, previously written down statements, give the big picture strategic direction of your company and the target business goals and outcomes related to your session. Direct much of your discussion around key business processes that you feel are impacted by the company's strategic direction and business goals.

Clearly stating the overall business goal or outcome for everyone is the crux of this step. You may need to come back to this step periodically, if later discussions wander

off from the intended target. This step is a great opportunity to get everyone on the same page (and to demonstrate your situational fluency). You also are likely to learn something new and important from others in the group about their perspective of strategic plans, initiatives, or internal challenges of the corporation.

If you're doing a two-day session, during the first day try to avoid discussing future opportunities and cloud applications or services. Focus the group on understanding your company's key challenges and understanding how key business processes are currently functioning.

## Identify and agree upon activities and roles

In this step, your situational fluency acts like an engine to drive the discussion forward. You will lead the group in agreeing upon and documenting the high-level activities, roles, and information associated with the business process that are needed to achieve the business goal. Continue until everyone agrees that all the high-level activities that could affect the business outcome have been listed in sequence.

When you first do this step, start with the beginning activity, or, if necessary, work

backward from an endpoint of the business process and document it with as unique a label as possible on the center board. While on the step, ask who is responsible for the activity and place the title or role to the left of the activity; then ask what data or information is being used or manipulated by the activity and place a name for that information to the right of the activity.

Keep the conversation positive and investigate problems or opportunities as appropriate since this step can become

tedious. During the envisioning session remember that it is not necessary to drill down to granular levels, but it's important to capture all the critical high-level activities as quickly as possible. Try to finish this step on the first day, and only revisit this step on the second day to refresh the audience with its information.

Sometimes you will encounter disagreement amongst the participants regarding the order of the activities. Spend time with the group discussing any of these issues and re-order activities, and/or add additional activities, until the group reaches general agreement. An electronic spreadsheet projected onto a screen in the room can be an effective tool to coordinate this process, due to its dynamic nature.



Figure 12-1 Agenda for envisioning session

## Validate your findings and initial insights

Based on your homework on your company and your process mapping work, you probably developed a set of perceptions, including some initial insights. During the envisioning session, you may learn that your initial perceptions may not be accurate. Determining which of your initial findings are valid, and which are invalid, is the purpose of this step, along with capturing new relevant information.

If your initial findings and insights aren't valid, you need to find out right away, or the consequences can jeopardize the entire endeavor. Therefore, lead a discussion where you present your initial insights and understanding of the key issues, and get everyone's feedback. Encourage disagreement, clarifications, and corrections. Capture all this information, evaluate it, and adjust your work accordingly.

## Identify any problems limiting progression to next steps

Throughout your session, problems may surface that will prevent or limit moving forward. If that occurs, be sure to capture

that information in a problem statement. Every problem stated should identify the activity associated with it. A problem

stated may or may not be an accurate representation of the situation, but every problem stated in the envisioning session should be treated as an obstruction and assigned to an individual (present or not present) to review and evaluate. Try to assign the problem to an individual who has authority with the activity associated with the problem.

## Ask “what if” and identify opportunities for transformational cloud solutions

Now, finally, you focus the group discussion on future opportunities and cloud solutions. In our two-day sessions, we spend the first day on the previous parts of the envisioning session, and the entire second day on this last part of the session.

It's time to start identifying opportunities for cloud solutions. This effort starts by reviewing each activity you listed in the business process you're working with, but this time you focus on “what-if” scenarios.

Ask what-if questions. Try to understand what is desired to transform the business for each activity listed. For example, let's say order arrival activity delivers order information in a batch transmission nightly. Someone might ask, “what if this order information was delivered instantaneously?” This would enable the company to fill orders faster (assuming the stock and credit check passed). Here you can sketch out a technical solution: Perhaps using Azure Logic Apps to process orders and direct them to Dynamics 365, for example.

The statement of a problem may sometimes result in a discussion of an opportunity for a cloud solution. For the envisioning session, the problem statement may be copied or restated as an opportunity, but for our work, keep it in its problem-oriented syntax to avoid ambiguity of what the problem is down the road.

Consider reordering or consolidating activities to gain efficiency and increase simplicity. What if the stock check and order arrival activities were consolidated, giving the customer immediate feedback regarding the out-of-stock notification, and then notifying them they will be informed when it is back in supply? Or if custom applications could be replaced by more economical SaaS equivalents?

Remembering the first rule of brainstorming—no idea is a bad idea—explore truly transformational ideas. What would it mean if you could transform your business model from a capital goods model to a subscription-based one? By upgrading your internal HR systems, how could you improve employee productivity—and entice a new generation to work for your company? How could you transform your customer service experience by continuously analyzing telemetry from the field and taking proactive action to prevent faults?

## Mind=blown: Next steps

If your envisioning session has been a success, you'll know it: You and your participants will have imagined any number of ways to catapult your business forward; perhaps you've even rethought some of the core tenets of your business model. Hopefully you've found it both empowering and exhilarating.

From your envisioning session, you've generated a list of ideas—and you're wondering what the next steps are. In the

next chapter, we'll talk about ways in which you can take those ideas and make them real. We'll discuss how a hackathon can validate the technical feasibility of your ideas—and can continue the excitement and momentum from the envisioning session. We'll also show how a longer proof-of-concept can validate that the ideas can be applied to a real-world business solution, and then we'll describe how to actually implement them in production.

# Chapter 13.

# Make your transformation happen

You've documented your dreams, and hopefully you, and your envisioning session coworkers, have found them inspirational. You may have even come to the conclusion that these aspirations are more than "nice to have"—they are essential for your company's continued growth and success. But what actions to take now? In this chapter, we'll show you possible, proven next steps to making your dreams reality.

Back in Chapter 2, we noted that companies are effecting change in entirely new ways. Technologies—in particular, the cloud—allow you to try out new ideas quickly and inexpensively, without the need to purchase new hardware or software licenses. We called this the "what-how-why" approach: Taking a particular problem, solving it, and seeing how it can broadly impact the business.

In this chapter, we'll describe several ways you can implement the "what-how-why" strategy, and how these next steps can lead to institutionalizing innovation in your company. We'll also discuss how, once you've settled on transformative initiatives, to drive these changes through your organization.

## Experimentation: Hackathons and proofs of concept

Not so long ago, someone managing a marketing campaign would create the messaging and design collateral, and then engage any number of focus groups to get feedback. Today, digital companies continuously try and refine new marketing strategies through experimentation, trying different combinations of

online promotions and recommendations simultaneously to different geographies, different demographics—and are receiving ongoing, constant feedback (often called "A/B testing;" one selected group gets one set of content, another gets different content, and the results are compared).

It makes sense in today's digital age: It costs next to nothing to try these experiments, the results are as or more accurate, and marketers can see them virtually instantaneously.

Similarly, the ready availability of advanced cloud technologies makes it possible for you to try out new ideas in risk-free ways. Two techniques we've used with great success are hackathons and proofs of concept.

Before we go on, we'll note hackathons and POC's are by no means mutually exclusive nor does one necessarily follow the other. A hackathon may inspire a POC, or you may choose a POC independently of a hackathon; perhaps, for example, you have a team in a particular unit ready to focus for a period of time.

## Seeing is believing: Sponsor a hackathon

All of us, your authors, have led and participated in hackathons, and we find them one of the best methods to educate teams, to get them focused on specific problems, and to inspire the teams themselves as well as their management with what is possible.

In a hackathon, you bring together your teams to focus intensively, for a day or a week, on trying new technologies with the goal of creating functioning, demonstratable

prototypes. Hackathons can be small, with just a few people, or they can be quite large. Microsoft, to cite an extreme example, sponsors a company-wide hackathon every summer, a week-long event in which thousands of employees innovate on problems of their choice.

As Sir Richard Branson, founder of the Virgin Group, is quoted as saying, "The best way of learning about anything is by doing."

## Who to invite

With a focused hackathon, you and your team can quickly visualize what elements of a solution might look like.

In a hackathon, teams build software, so it's important that most, if not all, the invitees have software development skills. You may also bring in designers and user interface experts, if that is a key part of the deliverable for the hackathon, but remember that the goal is to have working code that can be demonstrated at the end.

Make sure, to the extent possible, that the team or teams are adequately prepared—everyone should be supplied with the necessary tools, such as laptops, development tools, cloud subscriptions, and so on. This will save a lot of upfront time.

Let everyone know what to expect. A hackathon can be a very intense experience in which participants will be required to come up with great new ideas, collaborate, learn new technologies on the fly, and try them out. While they can be challenging, they are very often exhilarating experiences.

## Running the hackathon

We suggest that hackathon be held away from the participants' day-to-day offices, the better they can focus on the task at hand. To the extent possible, you should help them eliminate outside distractions such as meetings and conference calls for the same reason.

To begin the hackathon, you should outline the problem or problem(s) you are seeking to solve, and in broad terms the sorts of solutions you'd like to see; for example, "using cloud big data technology, show how we can get better default forecasts from our customer history data," or "how can we better predict field equipment failure rates if we monitor telemetry in real time."

Manage the scope appropriately: You shouldn't try to prototype the entire transformation or your entire book of dreams at once. The goals of the hackathon should be achievable.

Consider bringing in internal or outside experts as instructors or facilitators. Many consulting firms now have experts who regularly conduct hackathons. In addition, cloud vendors such as Microsoft are usually eager to offer technical experts providing instruction to your teams. Having a half-day class on the first or second day of the hackathon can jump-start your teams' activities.

Hackathons are collaborative, social events, and you should reserve time at the end of each day for teams to present what they've learned—providing the beginnings of best practices for your organization.

And lastly, don't expect that any of the code that teams write during a hackathon will ever be used in production. The goal is not to create enterprise-grade, resilient software that can handle all the possible scenarios and exceptions that can happen, but rather to learn, to explore, and to innovate.



Figure 13-1 Microsoft hackathon, many teams

## Create proofs of concept

Like a hackathon, a proof-of-concept (POC) is an activity usually targeted at demonstrating the viability and feasibility of a set of ideas or hypotheses. A POC, however, has a much larger scope than a hackathon, and often promising results from a hackathon will drive a more indepth POC. Further, the objective of a POC differs from those of a hackathon: Where the hackathon is intended to explore new possibilities, the POC is more aimed at validating a particular approach, to reduce or eliminate specific areas of doubt, and to gain a better understanding of what the implications—to the organization, to the business, to the technology—of a change might be.

POC's run longer than hackathons, a few weeks to a month or two; however, like hackathons, it's important that the POC be time-boxed, and that expectations on behalf of the participants and management alike be properly managed. Given the longer time-

frame, it will be tempting to add features as the POC progresses; this "feature creep" must be carefully managed as it can delay completion of the POC and thus hurt its credibility. Having a clear answer to the question, "what is success for the POC?" is essential.

Typically a POC is performed by a team of individuals with both technical depth and expertise in the business domain—that is, usually by a project team in IT (or a technology team in the business). The end result should be clearly documented in advance, and might include:

- Technical feasibility analysis, learnings and best practices derived from the POC;
- A "future state" description of what the solution will look like when completed and deployed;
- Anticipated business value of the solution when deployed—new markets reached, new customers enabled, costs reduced, transaction speed enhancements, and so on.

## Create your digital innovation lab

It doesn't take long to realize that innovation and transformation are not one-time events in the digital era: They are ongoing. A few years ago, "big data" technologies forever changed how we think about the storage and management of data; shortly thereafter, new analytics packages arrived that could ingest that data; then, machine learning and AI. This cycle of platform innovation is not likely to stop or slow.

In response, many organizations have created innovation laboratories as a permanent home for experimentation. Innovation labs answer

the question, "how will emerging technologies impact, positively or negatively, our business?" In such a lab, new ideas and new technologies can be tested and perfected without impacting the business—until they are ready. Conversely, if an idea does not pan out, no damage has been done.

Companies have taken different approaches to institutionalizing innovation. Many have built permanent technology innovation organizations; what is key, however, is that the lab show value quickly, and not get "stuck"

in very long-lead projects. Leaders must be obsessive about results and avoid their lab being tagged as a “trendy money pit.”

The home-improvement retailer Lowe’s possesses such a group in Christiansburg, Virginia, in partnership with nearby Virginia Tech University (many labs of this sort are

Numerous retailers—WalMart, Kohl’s, Staples, Macy’s, and Lowe’s competitor Home Depot (in partnership with Georgia Tech University)—have all built similar innovation labs where they can test new ways technology can advance their businesses.

Equally, nearly all the major companies in the fast-moving financial services space have their own innovation labs; Deutsche Bank just opened its fourth such organization, in New York City (others are located in Silicon Valley, London and Berlin). Its goals: “to help the bank evaluate and adopt emerging technologies, to develop a culture of innovation and contribute to the bank’s digital strategy,” according to their press release. Other financial giants, including Fidelity Investments, Morgan Stanley, JP Morgan, and Goldman Sachs, have their own labs as well.

purposely located near academic centers). Robotic “exoskeletons” that could help store employees lift heavy items; virtual reality “Holorooms,” using Microsoft’s Hololens that help teach customers basic home repair skills without getting their hands dirty: These are some of the advanced projects underway.

Many innovation labs work in partnership with startups, and may provide office space and other facilities—not unlike accelerators.

An entirely different approach was taken by a large petrochemical corporation. Each year they sponsor an innovation event in which several outstanding employees are given an opportunity to work on a single, innovative project for that year. The catch: It must have a \$50 million ROI.

Finally, some organizations have actually created entirely new companies or joint ventures to foster innovation. PNC Financial Services in Pittsburgh, for example, recently launched “Numo,” a wholly owned subsidiary which is a technology incubator for the financial services industry.

## Change your organization

At some point you’ll want to take some of the ideas, prototypes, and/or proofs of concept and implement them as real, operational business solutions in production. To do so, it may be necessary to change existing applications and processes, change or adapt data models, or retrain business and technical staff, to name a few.

These are all components of organizational change management, and becoming adept at it will be crucial to your success as a transformative—and continuously transforming—organization.

## Plan your change

As you plan your change, you'll need to have a comprehensive understanding of your current "as-is" state and a solid view of the state you're trying to achieve—the "to-be" state. The difference between the two is sometimes

known as a gap analysis, since there is a gap, which consists of an unknown amount time, resources and understanding, between the desired goal and the current situation.

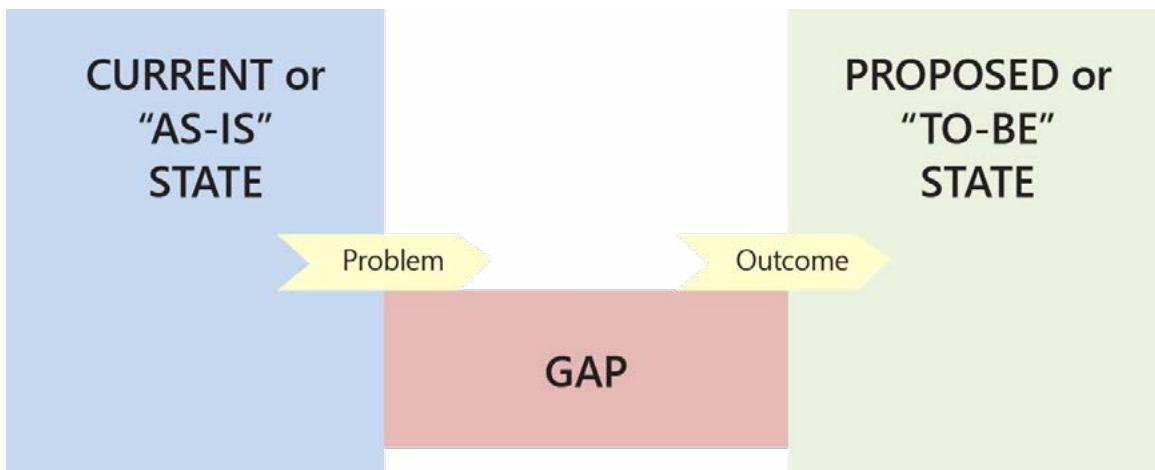


Figure 13-2 As-is, to-be, and the gap

The situational fluency we discussed in previous chapters will help you to understand the gap—which you then translate into your roadmap or plan, which will identify both the technologies and other changes (such as organizational) that will get you to your goal.

In order to prepare your organization for the change, you'll need to:

- Set goals and manage expectations. Evaluate your goals and ensure that they are measurable. The term "goal" should not be associated with a lofty unmeasurable outcome, but must be tangible and similar in nature to Peter Drucker's SMART goals: Specific, Measurable, Accountable, Relevant, and Time bound.

Initial discussions may be centered on the limiting business factors or problem,

which will require the collective audience in this situation to work toward stipulating the business outcome or goal desired. The specifically-defined, measurable business goal, or set of goals, may be coupled with their accompanying problem statements that are causing the limitation.

Make sure you understand and document any constraints that the solution must follow: For example, regulatory or risk mitigation issues, cultural or organizational issues, cost, and so on.

- Scoping or 'framing the expectation.' Scope is the process of setting contextual boundaries for the business goal; it is also stated as "framing the expectation". The scope establishes contextual boundaries and presents an understanding of where the analysis can stop.

- Know and enroll your stakeholders. Your stakeholders have authority to help make decisions towards the expectation, not influencers or those who lack authority. Authority is key because it is those people that can obtain resources, both human and material, needed to achieve the outcome. Ensure that they understand the scope and goals, and that they approve. Weekly updates (either in-person meetings, or via electronic means) will ensure that they are kept up to date.
- Ensure the business process details are captured. Your situational fluency has given you an understanding of the business process. You'll want to make sure you've captured the process details—the individual steps, the KPIs, how exceptions are handled—to ensure that you handle all of these in the new implementation.
- Document the data models. The key data entities of your business process or solution should be well-documented, at the conceptual, logical, and physical levels. Know both the semantics of your data (for example, what specifically is a customer and what attributes are needed by your systems) and the syntax (how many address lines there are, and so on).
- Aligning roles and business processes. As the new solution is implemented, roles—that is, the functions performed by people and by software—may change. Ensure that any training required is performed in advance.
- Document your technology assets. Build a “context diagram” showing which systems and applications participate in the solution and how they interact.

## The “to-be” analysis

After performing your analysis of the current state, it's time to describe the future state, and how to get there (the roadmap).

Document the to-be business processes. Create the to-be business architecture, which shows at a conceptual level how the new business processes run.

*To-be applications.* This portion of the analysis determines which current applications and their technologies should be maintained, which should be retired and where newer cloud applications and their functionality should be introduced. Functionality and services, in the form of cloud application components, effectively become the cloud application portfolio management suite that will be utilized to

support the solution.

Each required business process is assigned one or more application components that contains the needed application functionality that will serve up the activity and information, and be utilized by the role assigned to it.

*To-be information architecture.* As you potentially relocate your corporate data to the cloud, consider the security aspects—both “at rest” (on-disk) and “in-flight” (transmitted over networks). Take into account any document and information classification guidelines your company has, and consult with your information security team. Make sure you also consider backup/restore and disaster recovery (for more details, consult our companion volume,

Enterprise Cloud Strategy).

If your data models are changing in any way—say, if you are now utilizing an off-the-shelf SaaS application for customer relationship management and you wish other applications to interoperate with its data—consider using a message broker.

*Platform architecture.* Among the most important decisions you will make will be the one to use the cloud as your core technology platform, and how to use it. In other chapters, and in Enterprise Cloud

Strategy, we have provided the ‘why,’ ‘what,’ and ‘how’ for the cloud—we believe it’s the clear future for business computing.

*Cloud solution architecture.* After evaluating the new cloud solution from business, application, information, and technology perspectives, put together a single conceptual view of the solution. This concept solution diagram is used as a discussion point with the stakeholders and influencers by assisting with the validation of expected outcome and ensuring the problem was rectified.

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## Summary

In this chapter, we took the ideas we developed in Chapters 11 and 12 and showed you how to make them real. Consider institutionalizing hackathons—perhaps hold them on a regular basis, such as Microsoft does every summer. As we saw, hackathons can be a great way to quickly understand a

new technology and how it can be used in your business environment.

Think too about creating a permanent innovation laboratory, and connect with the startups that are creating new products in or adjacent to your space.

# Chapter 14.

# Disrupting in the cloud

So far, we've seen how you can imagine your future and how to make your digital dreams a reality. But was it all worth it? In this chapter, we'll talk about how you can measure the benefits of your transformation and of your use of the cloud to achieve it; then we'll provide you with a framework for thinking about your next steps—for this journey is ongoing.

Doubtless, you want to reap the most value from the implementations you've done, and you're probably not satisfied with the simple cost savings you've achieved by moving to the cloud—even though those may be significant. Your transformation generates business, technology, and economic value. Sharing and quantifying the business, technology, and economic benefits will bolster

the case for continuing to digitally transform the business. Value realization can take the form of tangible,—e.g., reduced costs, time saved, resources repositioned, etc.—or intangible—supporting more productive, strategically positioned, engaged, etc.—associates for your business. This chapter will present a number of benefits from three different perspectives—business, economic, and technology—and their values.

## Business benefits

As we've seen, digital transformation which is inspired by technological innovation, starting with the cloud, perhaps paradoxically relies on a business-first approach. By developing situational fluency with your business, and by using the "dream-design-deliver" approach, you can drive change in your organization.

We'll show how we realize business transformation benefits by:

- Allowing you to respond to new

opportunities more quickly;

- Maximizing the ROI of your business processes by delivering better business continuity, and enhancing business agility;
- Supporting new forms of business automation;
- Lowering total cost of ownership;
- And establishing a uniform, consistent, and isolated approach for compliance with the legal regulations.

## Quickly respond to new opportunities

As we've mentioned in previous chapters, the cloud allows your teams to try new things quickly and cheaply: This capability is critical now as the need to constantly update, change, and transform your business model and processes continues to grow. Gene Kim, Jez Humble, Patrick Debois, and John Willis,

in their book *The DevOps Handbook*, note numerous (large) companies that deploy new code thousands of times per day—new marketing campaigns, experiments, new products, and so on—something that would be unheard of a decade or two ago.

## Centralize in the cloud to maximize ROI

Consider centralizing your organization's business processes in the cloud. Migrating your applications and data to the cloud is a seminal event for your company, and one which you should take advantage of.

Think about the business efficiency you can gain by consolidating applications that overlap, by eliminating redundant capabilities. For example, in many IT organizations, many applications

maintain the same information about customers—say, their addresses. If one application has incorrect data, you may be missing out on an opportunity. Think about consolidating this information in a single location. Similarly, you may have multiple support applications for different product lines: Do you really need them all? Can you consolidate and get greater efficiency (and maybe even greater customer satisfaction)?

## Ensure business continuity at low cost

Keeping your applications alive and healthy is critical to you and your corporation's success; outages result in lost revenues, lost productivity, and lost opportunities.

Moving your IT ecosystem to the cloud reduces, at a stroke, your vulnerability to outages. Most cloud services sport at least a 99.5% availability SLA; redundancy is a core architectural design principle of cloud platforms.

In addition, consider taking advantage of cloud services designed to help you maintain availability and recover quickly from outages. With cloud backup services, you can ensure the integrity of your data whether on-premises or in the cloud. Microsoft's Site Recovery service provides automated protection and replication of your virtual machines as well as orchestrated recovery, when needed.

## Reduce complex business automation

Automating routine tasks yields greater efficiencies and contributes directly to the bottom line. Many tasks that previously required technical work—coding—are now available via simple point-and-click actions.

For example, if you want to see all mentions in Twitter of the hashtag for your product, that is a simple matter of using so-called “serverless” technology.

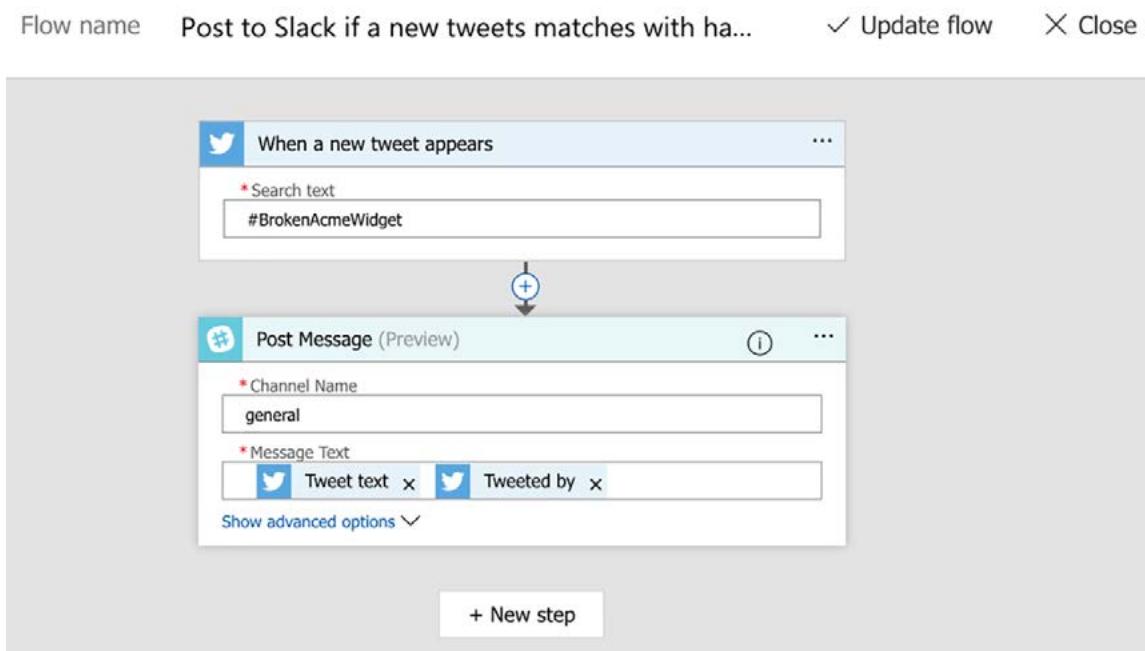


Figure 14-1 Microsoft Flow—an application with no programming required

In the illustration above (using Microsoft Flow), any time someone uses the hashtag "#BrokenAcmeWidget," we'll see it in Slack (a team collaboration tool).

That so much capability is now available to the non-programmer means that applications can be built in hours or days that used to take months—and that means your business is more productive.

## Lower your TCO and increase competitiveness

As we've noted, the essence of the hyper-scale cloud is that computing capability is available as you need it, and your costs decrease as you no longer need it. We'll cover the economic benefits of the cloud

in a moment, but suffice it to say that the reduced costs and increased functionality you will incur can mean additional investment in your business.

## Improve trust and compliance

Of course, to take advantage of the cloud, you need to trust it with a very valuable asset—your data. Microsoft Azure has made extensive investment in security and in compliance certifications in order to ensure your data's safety.

Encryption of data at rest and in flight; securing networks, carefully managing and controlling identity and user access to the cloud; and a multi-pronged approach to managing and containing threats—these

are all key to Microsoft's cloud security strategy. In addition, privacy is central to Azure: You control your data and you own it. Microsoft strives to ensure transparency to help you know how your data is stored, accessed, and secured.

Finally, Azure meets a broad set of international and industry-specific compliance standards and regulations, and Microsoft works closely with industry groups and governments to ensure the cloud is safe and secure.

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## Technology value

By now, it is generally accepted that the cloud provides dramatically improved technology value over computing on-premises, both for simple migrations from your data center—and more importantly for

your transformation. While much of what is possible in the cloud can be accomplished on-premises, you'll find it both faster and cheaper to deploy transformative solutions in the cloud.

## Use adjacent capabilities to expand the functionality of your applications

One significant advantage of cloud services is what we'll call their "adjacency," meaning that each and every service in the cloud is basically placed at your doorstep. You don't need to acquire servers, or install software: It is now it is just a matter of configuring

the cloud services with the needed business functionality to support your requirements.

In many scenarios, the user need only make a few short clicks to completely setup a solution—requiring little or no code.

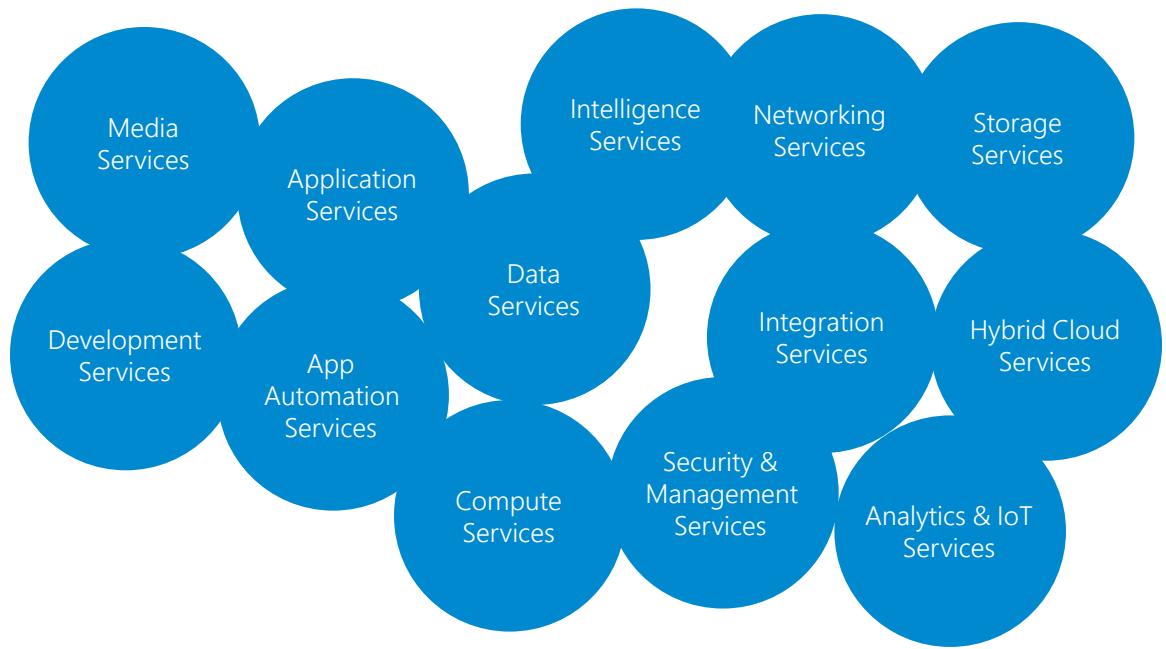


Figure 14-2 Adjacent capabilities

Because so many different services are available at your fingertips, Azure cloud services offer more solution possibilities than on-premises services and applications. Understanding the core purpose of a set of services—e.g., “Storage Services”—can

help you determine how to couple adjacent services together to form solutions. But connecting services to others enables newer paradigms and solutions that before would not have been available.

## Take advantage of always-current cloud platform

One of the challenges for a corporation is trying to maintain current services and modern platforms on which to reside its business processes and applications. In fact, a study by Microsoft IT a few years ago showed that the more modern the software (e.g., the more recent the OS or database), the fewer support tickets and less time to resolution for an issue.

The cloud keeps all business processes and applications on current services and modern platforms, establishing a solid technology foundation.

Cloud services are based on industry-accepted practices and methodologies, which promotes higher reusability. Higher reusability minimizes duplication, enhances productivity, and allows for quick integration of all business processes. Cloud services leverage industry standard interfaces to produce a seamless services layer that minimizes the effort and resources to put them together.

## Scale as you need to on the hyperscale cloud

Cloud services reside on a virtual platform that offers unlimited capacity to scale. Scaling on-premises services requires larger platforms and significant amounts of resources to perform re-platforming.

Monolithic servers that only offer a point solution and scale vertically are passé and expensive, whereas cloud services scale horizontally and offer unlimited capacity.

## Reduce your carbon footprint

Environmental sustainability is a key goal of all cloud providers, and a key benchmark for data center sustainability is Power Usage Effectiveness, or PUE. A PUE of 2.0 means that data center power usage is evenly divided between servers and support services such as air conditioning—essentially half the energy is being wasted on non-business functions.

Because of careful hardware engineering, innovations in data center engineering, and economies of scale, cloud data centers can reduce their PUE's to 1.1 or even less, meaning that nearly 90% of the power used by a cloud data center is directed to servers: in other words, to your business needs, and very little is wasted.

## Cloud economic benefits

First things first: What are the economics of moving to the cloud? Will you save money, and if so, how much?

That's a hard question of course, because everyone's IT environment is different. But there are some obvious "big-ticket" cost reductions that come with a cloud deployment. Reducing or eliminating the number of data centers you have can save millions, and by reducing the number of staff assigned to non-business-value

functions—such as installing servers, provisioning hardware and so on—you'll have more people focused on your business and not on technology.

A number of resources exist that can help estimate the costs of using cloud resources. For example, the Azure pricing estimator tool (shown on the next page) can help you estimate the monthly costs of the components of an Azure-based cloud solution.

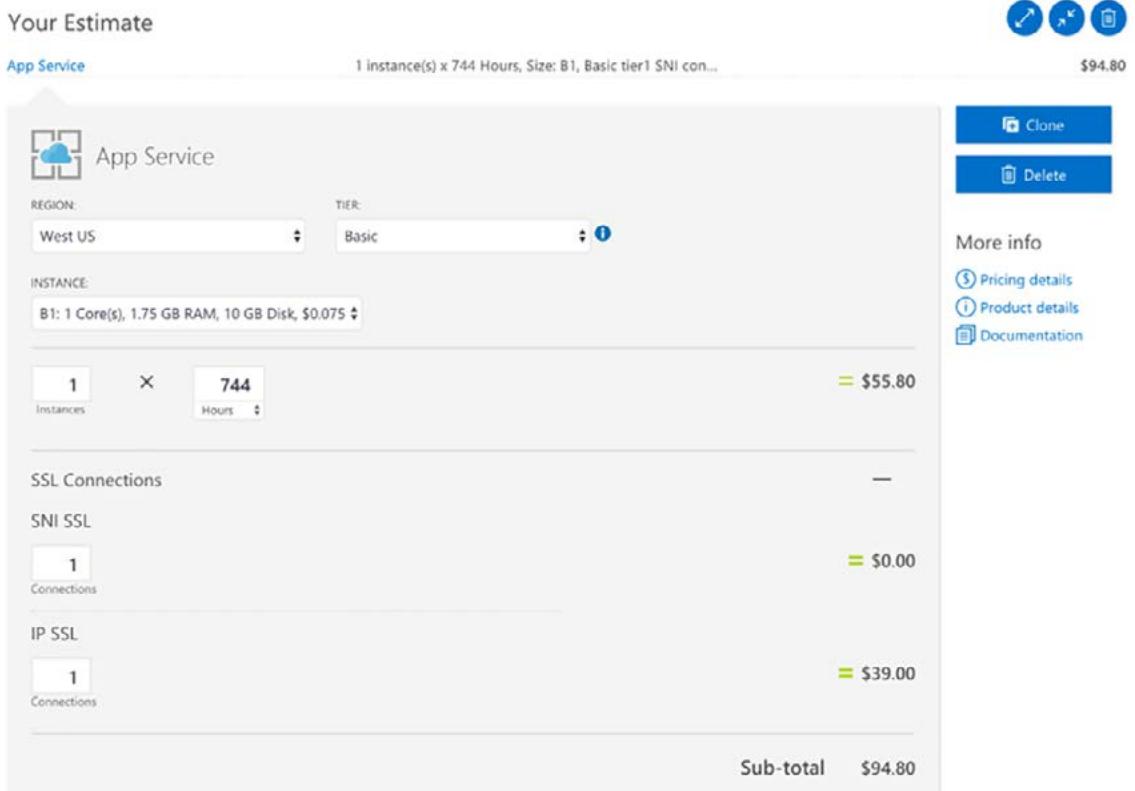


Figure 14-3 Azure pricing estimator screenshot

However, it's important to note that once in the cloud, there are many opportunities to reduce costs.

Here's one: Most IT managers, when deploying an application, will provision for the maximum load (in fact, one CIO we talked to used a rule of thumb: Whatever the development team thinks is the required number of servers, multiply by four).

But in the cloud, your teams can monitor on a daily or even hourly basis the load on the application, and reduce the number of servers—without impacting response time—as needed, thus saving money.

Moreover, they can examine each server's utilization and decide if perhaps a smaller one (less cores, less memory) will work just

as well—again saving money. It's worth pointing out that this sort of optimization is only possible in the cloud. (We talk extensively about how to optimize your cloud deployment in Enterprise Cloud Strategy.)

As we've been emphasizing throughout this book, however, to look at the cloud purely as a means to reduce costs is very limiting: It affords the opportunity for you to transform your business. Here's a quick summary of some of these opportunities as we've discussed throughout these pages:

- Greater opportunity evaluation through enhanced business correlations.
- Lowers costs and capacity limitations outages based on high reliability to maintain business continuity.

- Lowers costs through quicker setup to experiment with strategic direction shifts.
  - Lowers costs by reducing tactical work using higher intelligent automation, which will allow for more productive strategic or valued work.
  - Lowers total cost of ownership based on demand utilization by only using required resources, which allows for a reduction in core business product or service costs.
  - Lower costs of a legal audit or infractions by isolating or handling regulatory information uniformly and consistently.
  - Lowers infrastructure cost by maintaining a pristine foundation.
- 
- Lowers costs of development by controlling technical diversity and duplicate architecture stacks.
  - Lowers costs for on-going operation by using more efficient platforms that will consume less energy and resources.
  - Lowers costs related to integration by using services layers that directly connect standard interfaces that use standardization.
  - Lowers costs by using effortless and unlimited horizontal scaling to increase business capacity.
  - Lowers costs by minimizing platform outages and increasing durations between failures.
- 

## Summary

Business is required to move much faster than ever before. Establishing a foundation in the cloud ensures that you and your business can focus on the customer and your products or services. As competition surfaces, it will allow you to experiment with radical and innovative ideas quickly, in ways that previously were too costly. It will reduce tactical work that is wasting your resources by offering intelligent automation to allow the customer more independence and greater flexibility when using your services and products.

With cloud technology, there is no longer a need to worry about incompatibilities in the environment, since it is always maintained in a pristine state. Scalability and throughput can be adjusted quickly and effortlessly as your business grows or contracts. The cloud distribution around the globe gives

your applications high-availability and can be coupled with on-premises systems to serve up a more robust business continuity and disaster recovery model.

Economically, the cloud offers cost reductions in total cost of ownership and infrastructure maintenance and operations. The pay-for-play model offered by on-demand usage allows business to track actual costs used by business units. The economic value of usage applied only where and when it is needed is a huge economic benefit to the bottom line.

The “adjacent capability” of cloud services shows how easy it is to leverage complementary and supplementary services that before would require significant effort and resources. Continuous innovation is now possible with minimal effort to determine if a business strategy is palatable for future initiatives.

# Summary and conclusions

Modern digital technology, and in particular the cloud, are spurring a transformational change in the way that companies build products, engage with their customers, empower their employees, and optimize operations, so much so that this new digitization of business constitutes a Fourth Industrial Revolution. Every company should think about their current business model—and how they can take advantage of technology to both optimize their current processes as well as how to drive the coming disruption.

In Part I, we talked about the revolution in business that is occurring today, and why, with the advent of technology, enterprise computing will change dramatically and irrevocably. The hyperscale cloud, providing computing on-demand, means that companies can scale at will, can reach customers on any device anywhere in the world, and can quickly take advantage of cloud services that would take months or years to deploy in their own data centers. As we described, these capabilities have enormous implications for the business and for IT, and in many cases is so significant that a new role—the Chief Digital Officer—has been created to lead digitization efforts.

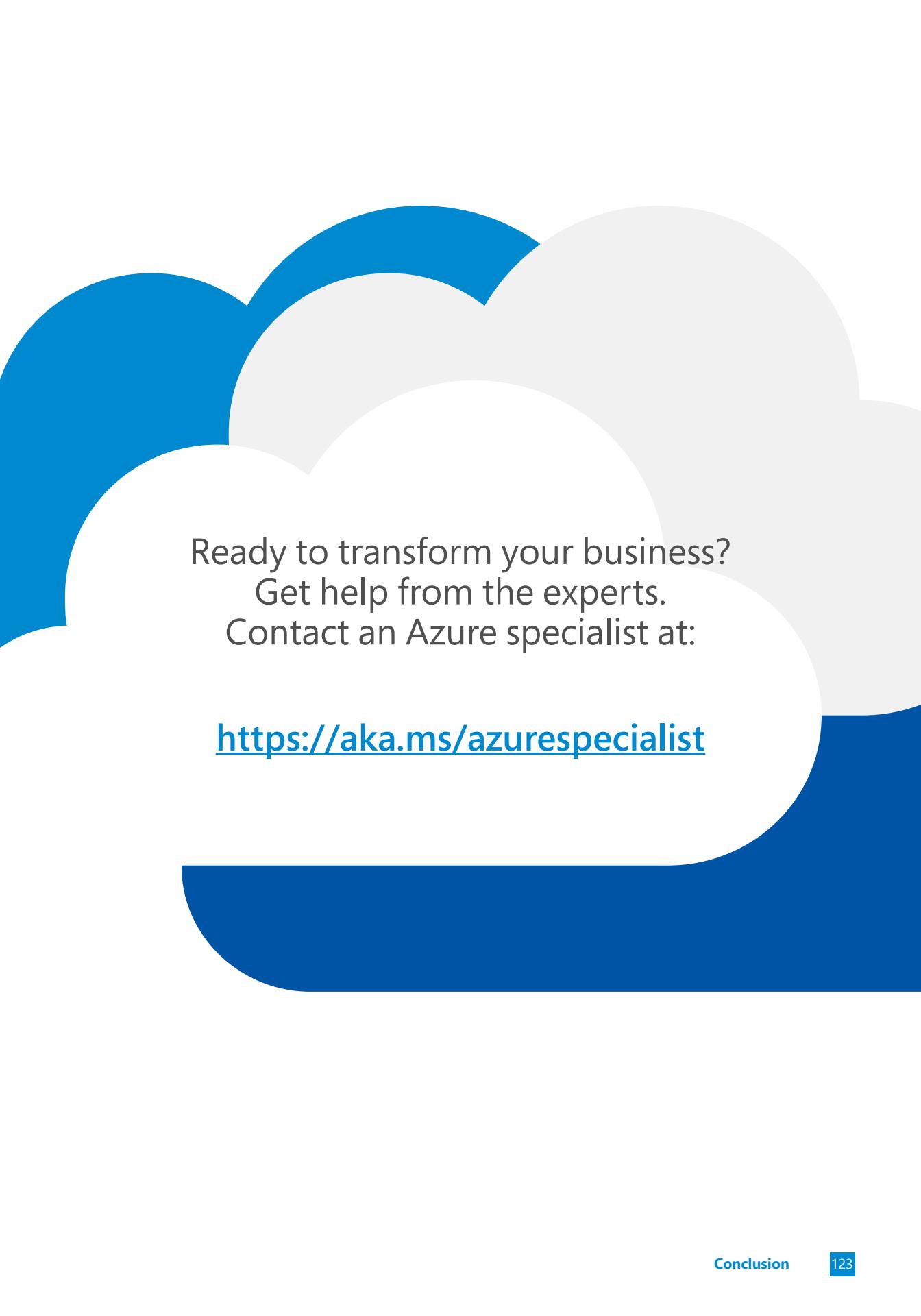
We hope that you were inspired by the stories of digital transformation we presented in Part II. Here, our intent was to inspire you: To show you that, first, amazing new cloud capabilities can be applied to any business, from jet engine manufacturing to regional hospitals to sports franchises; and second, that you can get the

benefits of these technologies quickly, by bringing together business professionals and technologists and imagining what the future holds.

With the world changing so quickly, how can you, pragmatically, actually begin your own transformation? In Part III, we described a practical set of steps that any company can follow, beginning with envisioning; then taking those ideas forward into creating a solution; and finally understanding the value you've created. We walked through a proven, tested step-by-step methodology.

All of us have extensive experience in technology, and we agree that the pace of change—not just in computing, but also in business—has never been so fast. Transformation and reinvention are on everyone's lips these days, and our goal in this book has been to show you what they mean and how to do them yourself.

We wish you success in driving your own digital journey!



Ready to transform your business?  
Get help from the experts.  
Contact an Azure specialist at:

<https://aka.ms/azurespecialist>

# Appendix.

# For further reading

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## Chapter 1: The cloud computing revolution

Industrial revolution

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# About the Authors



**Barry Briggs**, an independent consultant, has a long history in software and enterprise computing. He served in a number of roles during his twelve-year career at Microsoft, most recently as Chief Enterprise Architect in Microsoft's DX (Developer Experience) Team. Collaborating with Microsoft customers, Barry's team designed and built "epic" applications that show off the cloud and its potential.

Previously Barry served as Chief Architect and CTO for Microsoft's IT organization. Principal among his accomplishments were creating and leading MSIT's cloud strategy team, which put in place the strategy and processes behind the migration of Microsoft's internal IT ecosystem to the cloud. He also led the Enterprise Architecture team which aligned business strategies to technology assets for maximum impact and agility. He drove a strategic incubations unit which built cutting-edge software designed for IT-wide impact, and technology adoption strategies, which fostered the deep relationship Microsoft IT has with its product groups. Prior to the CTO role, Barry

led the team that created the world's largest Master Data Management (MDM) solution for Microsoft. He joined Microsoft in 2003 as senior architect for Business Process and Integration Division, which built BizTalk Server.

Prior to Microsoft, Barry served as CTO for a number of companies (Aptsoft, Wheelhouse, BroadVision, Interleaf); and before that spent 11 years at Lotus/IBM. There Barry was the lead architect and developer for Lotus' famous spreadsheet product, 1-2-3, for a number of years. In addition, he also helped develop Lotus Notes and led the technology integration of Lotus with IBM following the acquisition. He also created and led the team responsible for the world's first Java-based productivity suite, Lotus eSuite. In 1995 he was named a Lotus Fellow.

You can see what Barry's up to at his web site, <http://www.barrybriggs.com>.



**James Farhat**, a speaker, author and CEO is an internationally recognized operational

efficiency expert who leads organizations to leverage the latest IT technologies to improve efficiency, productivity and innovation to thrive in the ever-changing and competitive global market.

For over 20 years, James has helped his clients set a vision for their future that addresses the convergence of their business and technology, data capture and visibility, and how they all tie together. His passion is creating solutions to build and run more effective and efficient IT infrastructures—that improve business results while mitigating risk.

James regularly presents on the disruption of business and technology; focusing on cloud technologies where his business acumen and technical expertise makes him a sought-after and trusted strategic advisor to organizations across multiple industries including financial services, retail and manufacturing.

James is the founder and CEO of ACTS, a Microsoft Gold Partner technology solutions provider.



**Eduardo Kassner** is the Chief Technology & Innovation Officer at the One Commercial Partner Group at Microsoft Corporation. His team is responsible for defining the strategy

and developing the programs to drive the technical capacity, practice development, and profitability for hundreds of thousands Microsoft partners worldwide. He has built 27-plus years of experience managing, architecting, and designing complex IT environments, and connecting IT and Business Objectives in real life. He has lead teams that actively helped international corporations and governments with these challenges in a direct and no-nonsense approach, combining structured frameworks with hard-earned experience, linking discussions from technical all the way to business value with the ability to link the Microsoft technology stack to the way it can land and provide value in an enterprise or government environment. He recently co-wrote and published the Enterprise Cloud Strategy e-book published by MS Press which has been downloaded over 300,000 times from the Azure.com website. Eduardo has lead the teams that designed, hired, and managed the Microsoft Cloud Architecture role and worldwide community, Cloud Adoption Frameworks, Operations Management, Automation, and Architecture Patterns. He commonly speaks in conferences worldwide on the topics of: digital transformation, cloud adoption and strategy, cloud architecture best practices, public/hybrid/private cloud, operational efficiency, IT return on investment and total cost of ownership, and the overall Microsoft Platform.

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## Stay in touch

Let's keep the conversation going!

We're on Twitter:

Barry Briggs: @barrybriggs

Eduardo Kassner: @ekassner

James Farhat: @jamesfarhat

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*"This book is a must-read for anyone responsible for moving their company to the cloud or digitally transforming it. It clearly lays out the benefits, considerations and steps, and includes detailed real-world case studies of successful transformation projects."*

**Mark Russinovich**

Chief Technology Officer, Azure  
Microsoft Corporation

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**Gavriella Schuster**

Corporate Vice President, One Commercial Partner  
Microsoft Corporation

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*"If you're not thinking today about how your business environment will be reshaped by the cloud and by other digital technologies, you're risking your future. The easy and robust availability of practically unlimited amounts of computing and data storage capacity in the cloud, along with fast networks, changes not just how you do IT but how your business operates. In today's world, you can reach your customers anywhere, anytime, on any device; with real-time telemetry analyzed in the cloud you can proactively maintain industrial equipment, anything from air conditioning coolers to jet engines; and you can give your employees the tools they need to do their jobs better. This book gives you the roadmap to envision and achieve all of these, transforming your business along the way!"*

**Ulrich Homann**

Distinguished Architect, Cloud + Enterprise Engineering Group  
Microsoft Corporation

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*"I found in **Designed to Disrupt: Reimagine your apps and transform your industry** a great travel compass and source of wisdom for Business and IT professionals starting their digital disruption journey.*

*It is a robust compendium of inspirational ideas and best practices in technology, people and processes to combine short-term disruptive impact in the organization with mid/long-term competitive advantage consolidation through digital."*

**Alberto Granados**

Asia Pacific Vice President of Sales, Marketing and Operations  
Microsoft Corporation

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