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Giving Machines a Voice

for dummies

A Wiley Brand

Connect people and machines with IoT

Build a productive, collaborative workplace

Leverage IoT technology to maximize ROI

Zeus Kerravala

Mitel Special Edition

About Mitel

A global market leader in business communications powering more than two billion business connections, Mitel helps businesses and service providers connect, collaborate, and provide innovative services to its customers. Mitel's innovation and communications experts serve more than 70 million business users in more than 100 countries.

Spanning five decades, Mitel's broad portfolio of communications and collaboration solutions leverage the cloud to help businesses increase productivity, enhance customer engagement, and accelerate digital transformation.

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by Zeus Kerravala

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Giving Machines a Voice For Dummies®, Mitel Special Edition

Published by
John Wiley & Sons, Inc.
111 River St.
Hoboken, NJ 07030-5774
www.wiley.com

ISBN: 978-1-119-50554-9 (pbk); ISBN: 978-1-119-50553-2 (ebk)

Manufactured in the United States of America

10 9 8 7 6 5 4 3 2 1

Publisher's Acknowledgments

Some of the people who helped bring this book to market include the following:

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Introduction

The emergence of the Internet of Things (IoT) — billions of devices with embedded sensors that report their location, status, and conditions — is forever changing the business world. Previously isolated, distant assets are now visible and accounted for. Until now, IoT has been driven by machine-to-machine communication. In other words, one sensor pings another sensor, and so on. As the number of sensors increases, machine-to-machine communication will continue to be important, but the human connection to everything is the most significant development.

Think of a basic IoT sensor and then add interactive voice response and contact center technology. With those technologies working together, when that sensor trips, the machine has a voice. In response to conditions, it can send a text, an email, a chat, or a synthesized voice message asking for instructions or informing the right people of important information. The messages and functionality can be more sophisticated depending on the needs and the type of sensor.

Giving machines a voice makes enterprises more productive by streamlining workflows, which, in turn, reduces costs. For example, companies with fleets can save time and money on preventive maintenance by notifying mechanics when a part is showing signs of wear. It also provides competitive agility: Companies can respond quickly to changes in market conditions or adjust inventory by keeping the right quantity of products in the right place. Giving machines a voice can also reduce losses and inventory shrinkage that result when a company doesn't have a handle on the location and status of its assets.

About This Book

Giving Machines a Voice For Dummies, Mitel Special Edition, consists of eight short chapters that look into

- Why machines need a voice (Chapter 1)
- The role of UC&C in IoT (Chapter 2)

- The challenge with traditional Unified Communications (Chapter 3)
- How team collaboration is key to giving machines a voice (Chapter 4)
- Collaborating with machines (Chapter 5)
- The real-world benefits of giving machines a voice (Chapter 6)
- The importance of IoT analytics (Chapter 7)
- The ten steps to giving machines a voice (Chapter 8)

Icons Used in This Book

This book uses special icons to call attention to important information. Here's what to expect:


REMEMBER

This icon points out information you should commit to your non-volatile memory, your gray matter, or your noggin — along with anniversaries and birthdays!


TIP

Thank you for reading, hope you enjoy the book, please take care of your writers! Seriously, this icon points out helpful suggestions and useful nuggets of information.


WARNING

This icon points out the stuff your mother warned you about. Okay, probably not. But you should take heed nonetheless — you might just save yourself some time and frustration!


TECHNICAL STUFF

You won't find a map of the human genome here, but if you seek to attain the seventh level of NERD-vana, perk up! This icon explains the jargon beneath the jargon and is the stuff legends — well, nerds — are made of!

Beyond the Book

There's only so much I can cover in 48 short pages, so if you find yourself at the end of this book thinking, "Gosh, this was an amazing book; where can I learn more?" just go to `www.mitel.com`.

Where to Go from Here

If you don't know where you're going, any chapter will get you there — but Chapter 1 might be a good place to start! However, if you see a particular topic that piques your interest, feel free to jump ahead to that chapter. Each chapter is written to stand on its own, so feel free to start reading anywhere and skip around to your heart's content. Read this book in any order that suits you (though I don't recommend upside down or backwards).

IN THIS CHAPTER

- Understanding the potential of machines having a voice
- Reviewing the importance of IoT

Chapter 1
Why Machines Need a Voice

You talk to machines all the time. Voice-activated devices are all around us — making a phone call in your car, finding a movie to watch on your smart TV, or even interacting with some kitchen appliances. You're already using the Internet of Things (IoT) to make your everyday life easier.

But what if machines could talk back? And what does IoT have to do with giving machines a voice? You discover those answers in this chapter.

What if Machines Could Talk Back to You?

To a certain extent, machines already talk to us, typically via SMS or email. Giving IoT sensors a voice and integrating those sensors into the workflows at the center of a business takes that technology to a whole new level. This kind of integration will radically change existing customer experiences.

Some of the experiences might seem fairly mundane. For example, what if your refrigerator not only listened to you but also told you when it needed a new filter? It could order the filter and have it delivered before you even knew you needed it. The main accomplishment here is time saved and a shorter to-do list.

Some experiences might be more critical, such as the freight your company is transporting telling you its location and ETA, then proactively alerting the right people on its status. This would help ensure the right freight is in the right place at precisely the right time. Again, this saves time and makes an organization more productive.

But other situations might be life or death. What if a heart pump could alert a clinician that it's about to fail? A patient could avoid a life-threatening issue — all because machines were given a voice.

From basic issues like a new filter for a fridge to the chance to save a life, giving machines a voice will change everything. Combined with unified communications and collaboration (UC&C), contact centers (CC), and notification solutions, machines are gaining a voice that will usher in profound business and societal changes.

An Overview of IoT

Internet-enabled devices have existed for years. But now, those devices are getting smaller, and they're outputting data by the second. How did we get here, exactly?

An increasingly connected world

We live in a world that's more connected than ever. IoT devices are spreading like wildfire. In 2017, there were 25 billion connected devices. By 2025, ZK Research forecasts that number will more than triple to 80 billion devices. See Figure 1-1.

How has IoT gotten so big, so fast?

IoT has grown rapidly thanks to the rise of low-cost sensors, wireless connections that are almost universal, the growth of the cloud, and the development of sophisticated machine learning. Each one of those components plays a critical role in IoT and will be a key to giving machines a voice.

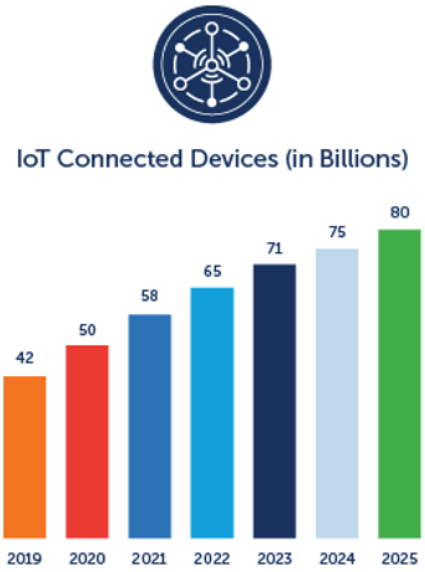

FIGURE 1-1: IoT devices to reach 80 billion by 2025.

Low-cost sensors

The electronics that make up the interior of sensors have become dramatically cheaper and smaller. In fact, the average cost of a sensor is projected to drop to just $0.36 in 2020. The costs will continue to plummet from there, in a manner similar to the decline in the cost of mobile data around the world, making these sensors so cheap that they will become commonplace in the next decade and embedded in everything.

Nearly universal wireless connections

The rise of super-fast wireless connectivity in the form of widespread 4G LTE and burgeoning rollouts of 5G technologies combined with near-universal gigabit Wi-Fi coverage and low-cost radio technologies such as LoRa, SigFox, BLE, NB-IOT, ZWave, and ZigBee will provide the speedy, reliable transport that sensors need to communicate their whereabouts and conditions.

The growth of the cloud

Cloud technologies remove the burden of data storage from devices, making them more economical to engineer and roll out. In addition, the cloud has the elasticity and performance capabilities

required for large-scale machine learning to be conducted. Some large organizations can afford to buy racks of GPU-enabled servers, but the majority of companies will turn to the cloud.

Development of sophisticated machine learning

Sensors will generate significant streams of data. By utilizing machine learning and artificial intelligence to analyze this big data, enterprises will be able to anticipate traffic patterns, spot consumption trends, and deal with outages before they happen.

The rise of IoT will have a more profound societal impact on the way you work and live than the Internet did when it rose to prominence in the 1990s. Think about that. What was life like before the Internet? Communication was slow, connections were slower, inventories were cumbersome to track, and businesses had to rely on both facts and intuition because they lacked valuable data-gathering capabilities. Consumers had to spend much more time tracking down information to make good purchase decisions or, critically, deal with an important health issue. Now, enterprises and people are more connected, knowledgeable, and ready to make informed decisions because the Internet revolutionized communication and increased access to information.

Vertical industry IoT applications

IoT is forecasted to spur a big technology shift. IoT will enable devices that sense an error or abnormality to send an alert, as well as predict when a problem will occur and automatically notify the relevant people. Historically, IoT has been limited to only a few verticals, but according to ZK Research, it now has broad appeal across almost all industries:

- **Healthcare:** Remote monitoring of patient equipment, presence status, and inventory management; faster and more accurate patient care, cost savings, improved clinician productivity, and lower insurance costs.
- **Government:** Smart cities develop because of connected infrastructure; better security, reduced traffic congestions, and cost savings from connected lighting.

- **Hospitality:** Instant detection of depleted supplies, such as toilet paper, towels, or mini fridge items in guests' rooms; remote monitoring of refrigeration, ventilation, and pool filtration systems.
- **Education:** Security sensors boost student safety; supply inventory tracking improves; better student attendance monitoring; remote monitoring of refrigeration and HVAC systems.
- **Retail:** Connected inventory and greater knowledge of customers; personalized and predictive services, optimized inventory management, and social innovation.
- **Manufacturing:** Smart sensors and digital control systems; faster response to fluctuations in demand and maximized efficiency.
- **Sports and entertainment:** Real-time athlete performance monitoring; smart stadiums boost attendance; better traffic management and stadium security.
- **Field services:** Connected utility meters, smart grids, HVAC systems, plumbing, and more; significant cost savings and lower cost services.

REMEMBER

Companies and people are connecting everything. And, although the connections to the sensors are important, it isn't until those connections are integrated with business processes that magic happens. As a result, IoT devices will be more tightly integrated with our daily lives in such a way that they'll become transparent. Whether they monitor your health, the status of a shipment, atmospheric conditions — or pretty much anything — stop thinking of them as devices or sensors and start thinking of them more as extensions of yourself and your business.

IN THIS CHAPTER

- Bringing together many forms of communication
- Looking at UC&C in IoT

Chapter 2
The Role of UC&C in IoT

Unified communications and collaboration (UC&C) has transformed business communications by bringing together voice, conferencing, web meetings, chat, and presence in a single package. As such, it enables on-the-go communication across the entire organization, no matter which medium the user prefers — all with the device of your choice.

Bringing Together All Forms of Communication

Gone are the days when you need a massive videoconferencing system to launch a virtual gathering. Web meetings can now be started with a single touch, bringing together a full team within minutes; one user can launch a meeting from a simple app on a smartphone. The next wave of UC&C will be driven by application integration, cloud, team collaboration, and mass notification.

No matter what your office looks like, you most likely use some kind of collaboration tool. And, unifying your communications tools into one system can help your business run more efficiently, such as the example shown in Figure 2-1.

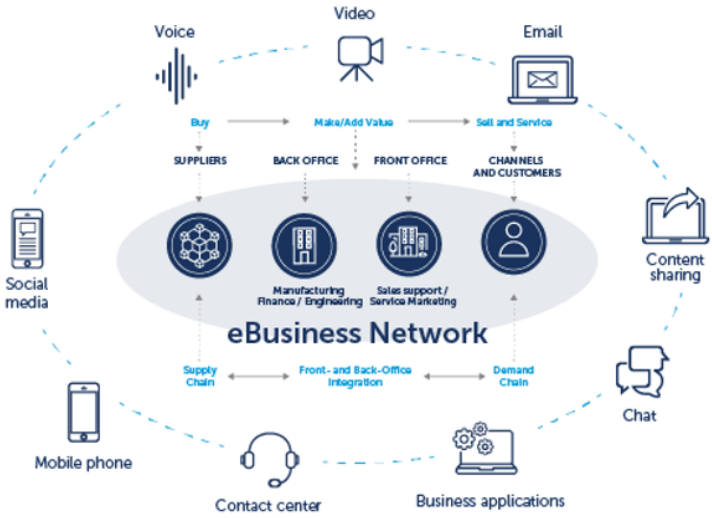

FIGURE 2-1: Unified communications enables better collaboration.

Playing a Central Role in IoT

UC&C plays a central role in IoT, providing the medium for machines to talk to humans. UC&C has historically enabled people to talk to people, and IoT lets machines talk to machines. Now, the combination of IoT and UC&C gives machines a voice. As a result, processes will be automated, with applications and machines talking to each other, looping in humans as needed and triggering necessary actions.

For example, with IoT sensors, a quick-service restaurant could monitor its refrigerator temperatures, check the status of HVAC systems, and detect water leaks. Using UC&C, the sensors can quickly alert the right people — no matter location or time of day.

IoT sensors can also track activity in a data center server room to monitor entries, control room temperature, detect motion, and field help requests — all from a mobile app.

Airport luggage trucks can be monitored with IoT sensors so that managers can corral them and put them in the right place to service departing and arriving aircraft.

Sensors can also be used to detect and monitor severe weather and — when connected via UC&C — can send alerts via text or social media to staff, parents, and students that school is canceled or delayed.

All the data IoT devices generate and UC&C systems analyze can be processed through artificial intelligence and machine learning tools to glean insights on trends and improve customer service. But, as these systems become more reliant on data, moving UC&C to the cloud will be a critical step to gain better scalability, performance, and reach.

IN THIS CHAPTER

- Seeing what happens when collaboration isn't unified
- Running ineffective remote meetings
- Putting too much stock in email
- Putting communications tools in silos
- Spending too much time managing communications

Chapter 3
Looking at the Challenges of Traditional UC

The need to collaborate more effectively is one reason unified communications and collaboration (UC&C) is in use or in the testing phase at the majority of organizations today. UC&C helps individuals to communicate and collaborate with team members by using a variety of integrated tools. However, effective team collaboration requires more than just individual-centric communication tools. Agile collaboration requires the ability for anyone to initiate real-time conversations with the entire team. Historically, this has been accomplished through in-person meetings, but this isn't possible for distributed teams and remote workers, who are often left with only email, chat, and conferencing calls as means to collaborate.

Unfortunately, these tools are ineffective and too slow for agile teams, particularly in the digital era of business, which leads to inefficiencies in the workplace.

Collaboration Isn't Always Unified

To increase worker productivity, companies have adopted a wide range of collaboration tools from multiple vendors. It's common to have separate, single-point solutions for audio conferencing, web and remote desktop sharing, video, and other functions.

The ZK Research 2017 Unified Communications Purchase Intention Study found that businesses have an average of five collaboration tools. The study surveyed more than 800 IT respondents who are responsible for collaboration purchasing across companies of all sizes. The lack of integration across vendors means the user must manually move information between the tools.

Only 23 percent of surveyed organizations have fully deployed unified communications. Check out the graph in Figure 3-1. With more than half of those companies not even having widespread UC deployments, it's clear most organizations don't use unified tools.

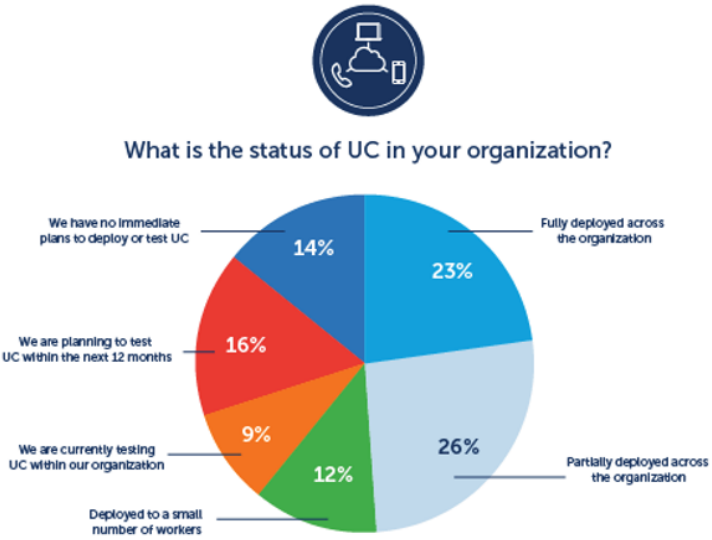

FIGURE 3-1: The state of UC across select organizations.

Remote Meetings Are Inefficient

Conducting a meeting with remote participants often requires logging into an audio bridge, a web-conferencing system, and a video solution. Within the conference room, a computer needs to be connected to a display, or content must be loaded onto an in-room PC. Each one of these tasks adds inefficiency to the meeting.

ZK Research interviews with large enterprises revealed that, on average, the first 15 minutes of every meeting are wasted setting up the technology. This is why, according to Ipsos, 53 percent of workers believe having more effective meetings would increase productivity.

Workers Are Too Reliant on Email

Although you can communicate in many ways, email has become a de facto standard for most workers. The chronological nature of email makes it inefficient because workers need to process each email individually and correlate it to a workstream. Also, all emails have the same priority because workers are unable to effectively assign priorities or relate emails to specific projects.

A recent McKinsey study found that the task of managing email now consumes 28 percent of a worker's day. And interestingly, about a third of workers feel too much email is hurting their productivity, according to Ipsos.

Communications Tools Exist in Silos

Each generation of workers has a preferred communications tool. Baby Boomers tend to prefer voice, while Generation X relies on email, and Millennials and Generation Z favor messaging. These communications silos make it difficult for workers of different generations to communicate effectively.

Ipsos found that 73 percent of workers who use traditional unified communications are somewhat or very interested in having their companies combine all their favorite communications tools into one solution. Of this group, 83 percent believe that having communications tools fully integrated into office productivity applications would be valuable.

Too Much Time Is Spent Managing Communications

The siloed nature of communications tools causes workers to spend large amounts of time looking for information and managing communications. In fact, an Ipsos study revealed that 51 percent of workers who use unified communications think they could save up to 20 percent of their time if their communications and collaboration tools were integrated, while 22 percent believe they could save 30 percent.

In the digital era, where decisions need to be made faster, workers must be able to collaborate more effectively, which requires organizations to use unified communications tools that incorporate collaboration into workflows.

IN THIS CHAPTER

- Understanding the importance of team collaboration
- Reaping the benefits of team collaboration

Chapter 4
Giving Machines a Voice with Team Collaboration

Because unified communications and collaboration (UC&C) allows teams to get together quickly and make the best decisions with the right information, it allows people to work better as a group and reduce wasted time and miscommunication. This provides a huge competitive advantage in the digital era — something businesses can no longer afford to ignore. That's where team collaboration comes into play. In this chapter, you learn more about the importance of team collaboration and the benefits it can provide to your business.

The Importance of Collaborating

Team collaboration solutions are designed to promote an ongoing dialogue between team members by providing a democratized forum for conversations and meetings. Successful collaboration requires teams to be agile and able to interact with every other team member easily, quickly, and simultaneously. This interaction includes

- Synchronous, real-time communications, such as voice and video
- Asynchronous, non-real-time tools, such as messaging and document management

In addition, team collaboration organizes the information by workstream, which could be a project, an individual chat, or a group conversation. This organizing principle is much more efficient than a tool such as email, which sorts information chronologically.

As the workplace continues to modernize, it becomes increasingly dynamic and distributed, and the process of enabling effective communications and collaboration becomes more complex given the number of places people work and the range of devices they use. Also, although communications and collaboration are distinct processes, the lines between them have blurred.

These trends drive the evolution of UC to team collaboration, which is enabled by the integration of cloud applications and collaboration features centered on the team to bring business value to all types of organizations in new ways. Instant messaging has been available for well over a decade, but those closed, proprietary solutions can't support file sharing and other communications functionality. Juxtapose that with team collaboration, which involves an open platform and incorporates all the functions teams require for effective meetings. These functions include asynchronous and real-time communications, document sharing, calendaring, task management, note taking, and other features that will lead to increased efficiency and productivity.

REMEMBER

One major difference with team collaboration is that it has been designed for a mobile-centric, cloud-first world. Traditional UC relies heavily on on-site infrastructure and is optimized for PCs or desktop telephones. Workers must look up information in one collaboration tool and manually enter it into another. For example, if an individual sends an email containing his or her phone number, the recipient would manually enter that number into a desktop phone to call the sender.

With team-based tools, the way employees talk, meet, and share information with others is simplified. By bringing together communications and collaboration tools into a single solution, it

becomes easier for workers to connect and collaborate with others from any place, at any time, using only a single application. For example, two people could be interacting via chat messaging and then easily promote the conversation to a voice call when needed. Then, just as easily, they could add more people to the conversation and quickly establish it as an online meeting where they can share content with all participants. Integrating collaboration tools with other forms of communication into a single solution, then aligning it with a mobile-centric world, makes it ideal for meeting the needs of today's workforce. People can remain connected while working from different offices or on the go from airports, hotels, and other remote locations.

Looking at the Benefits of Team Collaboration

One of the important elements of team collaboration is that through application programming interfaces (APIs), machines can be made part of the team. For example, in a hospital, a heart pump could send a message directly to a team collaboration workstream that also includes a nurse, doctor, and specialists. Businesses that deploy team collaboration can realize a number of benefits.

Saving money

With team collaboration in place and connected to machines in the field, a company can quickly understand the status of an activity or item monitored by a sensor. With a solid understanding of those devices shared with the people who need it, organizations can lower travel expenses and shorten employee transit times.

Improving worker efficiency

Team collaboration makes project groups more efficient because it becomes a single application for everyone to use and enables faster decision making. Because the application organizes information by workstream, workers don't need to search multiple applications for related information.

An example of a workstream application is Mitel's MiTeam, shown in Figure 4-1. Being able to access multiple team chats within a single application is key to productivity and efficiency.

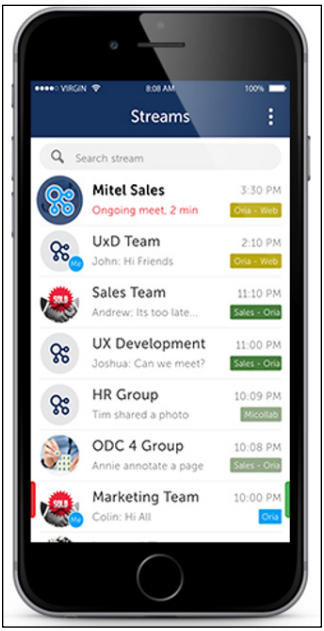

FIGURE 4-1: Mitel's MiTeam organizes teams by workstream.

A recent Ipsos study proved team collaboration increased worker efficiency. Examples include

- Forty-two percent of respondents reported time savings of up to two hours using team collaboration versus email, and 16 percent saved more than three hours.
- Thirty-three percent of respondents claimed to get one to two hours of their time back each day, 28 percent got two to three hours back, and 30 percent saved more than three hours.

Increasing productivity

It's important for employees to be able to communicate, even as they are completing a task or project. But sometimes, your hands are full and you can't fire off a message.

Organizations improve productivity because staff spends less time trying to connect with machines in the field and more time in productive collaboration and innovation — all because the machines are connected directly to team collaboration tools.

Decreasing email

Email can be a significant bottleneck for organizations looking to improve collaboration and efficiency. Important and critical priorities can stay buried at the bottom of an inbox.


TIP

Real-time team collaboration connects machines instantly to the groups that need information and can reduce email glut by an average of 40 percent, but can be as high as 70 percent.

Providing a single, cohesive experience

People use multiple devices and need access to critical information wherever they are. Consolidating communications channels into one team collaboration experience that works across all devices and connects to critical machines ensures staff members can respond no matter where they are.

Building stronger relationships

Using team collaboration to give machines a voice is an important way to connect an organization's valuable assets. But, it also builds stronger bonds between staff members, providing a platform for more personal, interactive communication and problem solving.

Connecting anywhere

Learning that there has been a status change in an important project while on the road — and not being able to do anything about it — is frustrating. The right team collaboration solutions enable employees to get messages from machines anywhere, anytime, on any device — and then collaborate with colleagues to monitor and address issues.

IN THIS CHAPTER

- Studying a Mitel readiness survey
- Exploring a case study: Frozen food transportation

Chapter 5
The Next Step: Collaborating with Machines

With a foundation for collaborating with people in place, after you give machines a voice, collaboration with machines and devices is the next logical step. It's no longer science fiction — it's reality.

A Readiness Survey

A recent survey was conducted by Mitel to determine if people were open to collaborating with machines. The results showed that and more:

- Eighty-five percent of those surveyed believe machine-to-people interactions will have a positive impact on customer experiences.

- About 75 percent think machines will be able to interact with people in two years or less.
- Nearly 40 percent expect machines with a voice to improve customer experiences and increase revenue.

Directly contacting staff

Seventy percent of survey respondents think machine-to-people interactions are at the core of making customer service more responsive and solving issues more efficiently. These interactions include when devices and machines do the following:

- Directly contact assigned staff
- Route information to the right individuals
- Proactively contact a customer when a threshold is triggered

Accelerating workflows

Accelerating workflows is a business imperative at the center of improving customer experience, according to 95 percent of respondents — ranking highest among those in finance, retail, and manufacturing. Responding more quickly, and with the right people the first time, is critical to providing the kind of experience customers have come to expect. Quicker workflows mean faster response times, reduced costs, and happier customers.

North America holds the lead

Companies in North America have a clear lead in embracing technology to better serve customers. Seventy-two percent of those surveyed reported having made over 50 percent progress in improving customer experience as part of their digital transformation initiatives. Nonetheless, barriers remain. Business and IT misalignment was identified as chief among them in using digital transformation to advance customer experience. Legacy infrastructure and systems were cited as the second most common obstacle, indicating the need for breaking through organizational silos and finding ways to modernize existing infrastructure.

Examining a Real-Life Use Case: Food Safety

A food service company is having trouble maintaining the correct refrigeration temperatures when transporting frozen food to its customers. The company has a public safety imperative to keep its food safe, and its customers need high-quality ingredients, but no one really knows what's going on in the back of the transport truck.

In this section, you discover how IoT-enabled environment sensors, paired with a communications solution, can mean the difference between spoiled food and happy customers.

Communications in the cloud

When an environmental IoT sensor detects a temperature fluctuation on a transport truck, cloud services should trigger an automatic phone call to the truck driver, notifying him that something is amiss. The driver can quickly investigate the issue and determine whether to escalate the problem to a manager.

The food service manager, when notified of the problem, can also trigger an additional process to send a text or push notification to a refrigeration technician or engineer, who can use cloud processes to quickly collect all the available data to diagnose the issue. All of this takes just a few seconds. With the results in hand, the technician can interpret the data and isolate a fix. If it's a broken part, cloud communications systems can escalate to a real-time video conversation with a supplier, determining the precise part number and arranging for shipment as soon as possible.

A happy ending — cold food

Behind this story is technology working in close partnership with people to solve a real-world problem. In a matter of seconds, a machine with a voice can alert a person of a critical issue. Then, continuing the conversation, the manager communicates back to the machine and escalates the issue. In just minutes, the issue was solved and a fix was on its way to the truck.

Lessons learned

Digital transformation is not only about emerging technologies, but also about how people, things, and data are being connected to those technologies. Giving machines a voice, an important step in the transformation, connects IoT devices to people and enables a range of innovative solutions. Together, people and machines can transform customer experiences.

IN THIS CHAPTER

- Working with sensors to eradicate pests
- Improving overall security
- Keeping track of emergency equipment
- Managing equipment maintenance
- Maintaining building environments
- Boosting your revenue

Chapter 6
Real-World Benefits of Giving Machines a Voice

The benefits of giving machines a voice aren't restricted to one industry or use case. This chapter gives you a few examples of how businesses have taken their customer experience and productivity into the future by giving their machines a voice.

Making Pest Control a Little Less Pesky

When a customer is faced with a pest infestation, every minute counts. Pest control companies who leverage technology that gives machines a voice can respond much more quickly with solutions like smart traps. When smart traps are triggered, they notify the proper professionals to collect the pest and conduct an inspection.

Smarter traps allow pest control companies to become more responsive to customers, while reducing costs and eliminating unnecessary truck rolls because of the additional insight they have before responding to the location.

Increasing Security

Keeping materials and people secure in your business is a top priority and can affect both your customer experience and your bottom line. The speed of notifications is key to protecting expensive assets from theft, tampering, or damage.

REMEMBER

Two ways to protect your site include monitoring door contact sensors and motion sensors with video surveillance. Door sensors can trigger desktop and SMS alerts to an on-site manager when a door is left open or opened by an unauthorized person. When motion sensors are tripped, security personnel are notified to check video feeds to assess the situation before reacting appropriately. Fewer wasted trips and a more rapid understanding of security threats promote safety and productivity.

Keeping Track of Vital Equipment

Knowing in real time where key equipment is and whether it has been accessed can be important, especially in case of an emergency. Take fire extinguishers as an example. When a fire breaks out, emergency responders want to know as quickly as possible. That means emergency personnel would benefit from being notified when a fire extinguisher has been used, even before someone calls 911.

Fire extinguisher door sensors can be programmed to send notifications via chat, email, or SMS to emergency responders and alert anyone nearby with an overhead page that the door is being opened. This trigger allows emergency personnel to respond quicker and with more information.

An Eye on the Machines

Internet of Things (IoT) sensors can detect problems with the machines as well. For example, a vibration sensor can detect when a machine is having more trouble doing its regular work and might be close to breaking down.

In a production line, a single machine breaking down can hold up the entire line, so preventing a breakdown can increase revenue and productivity. Preventive maintenance is a critical, but potentially time-consuming, task; however, with the right sensors and communications tool, a company can reduce downtime by targeting maintenance where it needs to go first.

Environmental Management

Certain types of machinery, like data centers, rely on specific environmental conditions to operate. Detecting what's going on in the environment around you is crucial for these business-critical machines.

For a data center, the early detection and resolution of the presence of water leaves little room for error. Humidity, air flow, and temperature are also important considerations. By using sensors to detect these environmental conditions, desktop alerts and voice paging can help maintenance respond quickly with the right tools.

But, don't forget about people and how they interact with the environment. Consider an airport where temperature management over such a large area is very difficult. Sensors placed in high-traffic regions can pinpoint temperature changes outside a given range and notify appropriate personnel immediately. Keeping customers comfortable is important to any business.

Improving Your Bottom Line

When machines and people can carry on a conversation, the benefits accrue directly to your bottom line. More efficient customer service reps — not weighed down by monotonous tasks now handled by machines — save you money because they focus on satisfying customers. In turn, those satisfied customers, who are served faster and more effectively, become enthusiastic repeat customers and evangelists for your brand.

REMEMBER

Beyond the imagination of developers and dreamers, giving machines a voice is a revolutionary step that helps your business grow and thrive.

IN THIS CHAPTER

- Using analytics to add value to IoT
- Seeing the ROI of IoT analytics
- Striving for a quick payback
- Selecting the right analytic tool

Chapter 7
The Importance of IoT Analytics

Simply gathering data accomplishes nothing unless you examine and leverage that information properly. Therefore, the key to getting your money's worth out of the Internet of Things (IoT) is analytics, first and foremost.

Unlocking the Value of IoT

IoT devices generate massive amounts of data. The use of sensors on non-traditional computer devices helps collect a wide range of analytics, including the following examples:

- State of a heart monitor at a hospital
- Quality of oil in machinery
- Oxygen level of an infant
- Room temperature
- Age of a fluid filter
- Location of a shipping container
- Speed of a vehicle

- Average occupancy of a meeting room
- Time of entry of an employee
- Location information of a customer

These data points can often be combined with other data to quickly identify trends or generate insights. For example, retailers can capture a mix of customer information, inventory data, Wi-Fi utilization, and social data to better understand customer behavior. This can be used to optimize store layouts, create promotions, or develop competitive offerings. The digital business era requires companies to move faster than the competition, and data is the key to accomplishing that.

Businesses have always collected and analyzed data but traditionally have done so using manual methods. However, far too much data exists nowadays for that to be possible. IoT endpoints generate a massive amount of information, and humans simply can't connect the dots between seemingly disparate data points as fast as machines.

REMEMBER

Machine learning and artificial intelligence (AI) systems won't replace the people who currently work with data. Instead, those people will supplement their current skillset and be able to do their jobs faster. For example, digital spreadsheets didn't kill off accountants; instead, they enabled accountants to work considerably faster because numbers could be calculated in a fraction of the time.

Understanding the ROI of IoT Analytics

The value from IoT deployments largely comes from analytics. Connectivity is obviously important, but the real value is in understanding the insights hidden in the data.

As is the case with most things in business, IoT analytics is not one size fits all. ZK Research identified three styles of IoT analytics that companies choose one or more of, depending on the goals for the organization. As shown in Figure 7-1, these analytic types are

- **Reactive:** Data is analyzed to find out what happened in the past. A good example is studying data in a factory to determine where a failure occurred. Reactive analysis is done primarily with manual data inspection. The backward-looking

data is critical in fixing the source of the problem but doesn't help the company with its digital transformation plans. A recent ZK Research survey found that 76 percent of companies perform this kind of analytics on IoT data.

- **Diagnostic:** Analytics are performed to understand why a failure happened. In the preceding bullet's example of IoT used in a factory, once the failed piece of machinery is identified, analytics can be used to determine why that particular piece failed. Data analytics enables businesses to solve problems faster and requires a mix of machine learning and human analytics. Roughly 64 percent of businesses are active with this type of analytics.
- **Predictive:** IoT analytics are used to predict outcomes before they happen, such as determining when an equipment failure will likely occur. Sensors in oil inside a machine could be used to study viscosity, machine wear, and other metrics that indicate when a piece of equipment might fail. When a certain condition occurs, a message could be sent to the responsible party via some combination of text messaging, email, or team messaging. In additions, predictive analytics requires the use of machine learning leveraging a "digital twin." Predictive analytics provides the fastest return on investment (ROI), but only 51 percent of businesses are performing IoT analytics for predictive purposes.

FIGURE 7-1: The spectrum of IoT analytics.

UNDERSTANDING DIGITAL TWINS

A *digital twin* typically refers to a digital copy of a physical object. The digital replica is identical in every way to the physical one, making it easier for companies to understand the dynamics of how IoT devices operate through an object's life cycle.

Digital twins allow companies to run "what if?" scenarios for predictive analytics. For example, an engine manufacturer could run thousands of simulations on a digital engine at a fraction of the cost of using a physical one, and that data can be analyzed and used for future planning. Digital twins have been used primarily in the industrial sector, but this concept is now being used by a wider range of businesses.

An interesting trend can be seen in the study of analytics. As analytics moves from reactive to diagnostic and then to predictive, the business value increases. It's also important to note the number of businesses looking to leverage IoT analytics actually goes down as the value increases.

This begs the question, "Why?" Do IT and business leaders not understand the value of predictive analytics? Anecdotal research suggests business leaders do indeed understand what's at stake, but IoT analytics can be seen as too big of a step to take all at once.


TIP

Many businesses are comfortable with performing analytics with manual methods, but applying machine learning is a huge leap. It requires hiring data scientists, aggregating data, and more. Start with reactive analytics and then aggressively chart a path to predictive as part of your organization's digital transformation efforts. This should minimize risk, while providing some immediate value and enabling your company to hire and train new talent.

Striving for a Fast ROI

Every business strives to get a return on their investment for technology projects. Some are straightforward to calculate because the hard costs are understood. For example, with voice over IP (VoIP), businesses would save money on long distance costs and the costs for moves, adds, changes, and deletes (MACDs). Similarly, the

money spent on corporate software-defined wide-area networks (SD-WANs) can easily be compared to broadband connections. Other projects, such as those using unified communications and collaboration (UC&C), are more difficult to calculate due to the number of soft costs related to worker productivity, effectiveness of collaboration, and, in the case of team messaging, reduction of email usage.

IoT is a combination of both, and the scope of soft costs versus hard costs and ROI vary greatly by industry vertical. With some businesses, such as retail, the ability to better track and manage inventory levels can have a well-defined, hard ROI. With other verticals, such as healthcare, it's less easy to understand the cost benefits. Payback time can also vary by industry, but for a good guideline, see Figure 7-2.

Payback Time	Business Value
Under 1 Year	Market Leading
1-2 Years	Ahead of the Curve
2-3 Years	Keeping Up
3-4 Years	Lagging
5+ Years	Danger

FIGURE 7-2: Businesses should seek a fast ROI on IoT projects.

The secret to success is understanding the key performance indicators (KPIs) that drive the organization and then measuring the performance by the improvement to those indicators. For example, in the healthcare industry, IoT can help improve patient care by sending patient alerts via SMS or team collaboration messaging to a clinician's mobile device. Traditionally, heart monitors required a nurse to listen for audible alerts, then check the machines. If there was a problem, the nurse would then page the doctor and sit by the phone until there was a response. This time-consuming process can often put the patients' health at risk, which drives up errors and insurance costs. In this case, the KPIs to follow are average speed of response and then error rates, and ROI would be derived from savings on insurance costs.

REMEMBER

Every business, large and small, has certain metrics that are a measurement of performance. The key with measuring IoT ROI is to understand what these are and be able to measure the baseline and improvement. After this is done, companies should seek a payback of three years or less. One ZK Research study interviewed dozens of companies with IoT deployments and found the payback on IoT projects varied from under a year to well over five years, with the bulk of companies being in the two-to-three-year time frame.

An ROI of under a year is truly market-leading and something only a small number of businesses can achieve. One to two years is impressive and ahead of the curve. Anything longer than three years is considered lagging, and companies that take five years or longer likely invested in the wrong areas and are at risk of going out of business. This is why it's so important to understand the critical business metrics before going into the deployment.

Looking at the Highly Fragmented Landscape of Analytic Tools

Analyzing IoT information requires having a good and clean data set. However, one can't perform analytics without the right tools. The challenge is that there is no single tool called "IoT analytics," so data scientists are forced to use multiple tools. On average, businesses will use three different tools to analyze IoT data. Some of the more common analytic tools include the following:

- Data virtualization
- API management
- Voice analytics
- Messaging middleware
- Data replication
- Natural language processing
- Sentiment analysis
- Software adapters
- IoT platform specific tools
- Network analytics
- Storage analytics

Analytics should also be a collaborative effort within your company. In a recent survey, ZK Research asked companies which groups had primary responsibility for IoT analytics, and the top response, at 30 percent, was IT and data sciences. Second (24 percent) was analytics, followed by consultants at 15 percent.

IT involvement is necessary because a technical background is often required to understand the data. With IoT, data spans multiple platforms, infrastructure, applications, and endpoints, and it's unrealistic to expect a data scientist to understand all the differences. IT can help normalize the information.

Next, you should understand where to get the IoT tools from. With newer technologies like IoT, there tends to be a propensity to rush out and buy an entirely new set of tools, but that isn't always necessary. Over the past several years, businesses have invested a tremendous amount of money into existing analytic tools, and those should be leveraged first.

In fact, data shows that 65 percent of organizations plan to use existing tools, making it the most common source. Other sources are shown in Figure 7-3, but existing or vendor-supplied tools are usually sufficient.

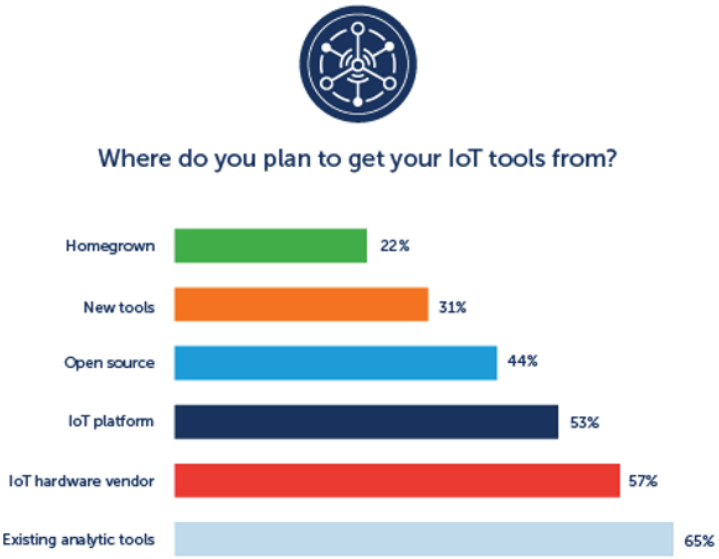

FIGURE 7-3: A wide range of IoT analytics tools exist.

As businesses embark on their IoT journeys, analytics needs to be top of mind. Business, IT, and analytics leaders should consider the following points:

- Understand specific business problems to determine what to analyze and the type of analytics to be used.
- Keep an open mind about changing analytic styles to meet the specific business outcomes.
- Focus on predictive analytics to maximize business value.
- Make IoT analytics a collaborative effort within companies.
- Leverage existing analytic tools for a fast start.
- Focus initial analytics projects on improving customer experience and worker productivity.

IN THIS CHAPTER

- Measuring and evaluating the value of giving machines a voice
- Collecting and analyzing data with machine learning
- Choosing an open platform and automating processes
- Enlisting the entire enterprise

Chapter 8
Ten Steps to Giving Machines a Voice

Giving machines a voice might sound like a fanciful goal fraught with difficulty, but, in ten steps, it's achievable and sustainable.

Move UC&C to the Cloud

We're in the midst of a few revolutions. The Internet of Things (IoT) is taking the world by storm. Ubiquitous and fast wireless coverage is enabling the deployment of connected devices just about anywhere they're needed. And, finally, the cloud is changing the way we communicate and store data forever. Moving unified communications and collaboration (UC&C) from an on-site data center to the cloud obviously takes advantage of the cloud trend. But, with the spread of IoT and the ubiquity of wireless coverage, it also assures a company that its UC solution will stay on the leading edge without time-consuming updates and truck rolls to keep the software current. Another advantage of cloud UC&C is that it delivers a consistent experience across every worker's device, as shown in Figure 8-1.

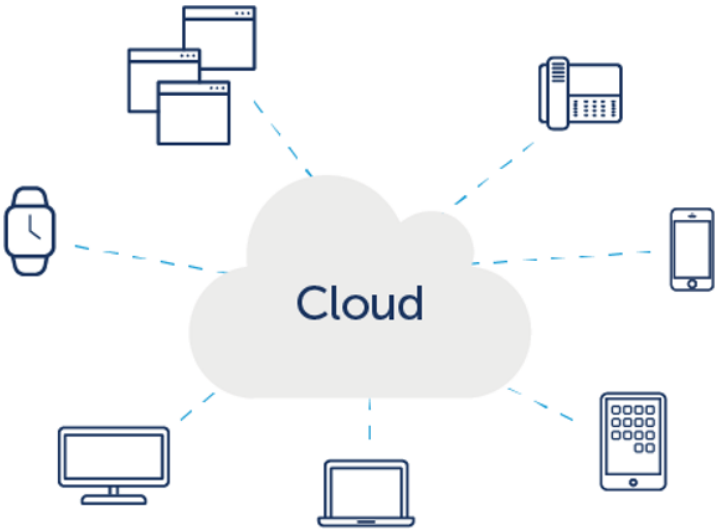

FIGURE 8-1: The cloud enables consistent communications across multiple devices.

For example, if a worker misses a call, the missed call can show up on the desk phone, mobile, and smart watch simultaneously. With the cloud, employees don't need to manage multiple communication systems. In fact, according to ZK Research, cloud-based UC&C is growing at a rate of six times the traditional on-site solutions. Businesses should consider moving their UC&C to the cloud to avoid being left behind.

Deploy Team Collaboration

People work from everywhere these days; a team collaboration solution keeps the workforce connected no matter where it is. Real-time communication and collaboration bridges divides and enhances the ability to share ideas and information. It should enable the creation of teams — both long-term and ad-hoc — as easily as if they were all in the same office. It should also enable easy document sharing so everyone can sing from the same songbook.

Connect Everything to a Common Network

UC&C in the cloud provides a common touchpoint for everyone in an organization. Even in the same physical office, with complex back-office systems cobbled together over the years, communication can be a challenge because parallel networks often crop up for specific purposes and then stick around. Unfortunately, these networks limit the value a company can extract from its on-site UC&C. With a cloud-based UC&C solution, everyone is connected.

Measure the Process Before and After to Understand the Value

Knowing where you are now is a central ingredient in understanding where you're going. And once you get there, having the data from before is invaluable. Make sure to examine the current process and document everything; then, after you've made the move to UC&C in the cloud, do a comparison. The results will be enlightening and help you in your journey to giving machines a voice.

Collect Sensor Information

Connect every sensor in your organization using UC&C. Then, collect the information and put it in the right hands — whether it's a person or another machine. This process can be as simple as building a workflow to enable temperature sensors to activate alarms, or as complex as building chat discussion groups or videoconferences based on specific triggers.

Analyze the Data Using Machine Learning

The data streaming in from your sensors contains the keys to success for your organization, so analyzing the data using machine learning is crucial. You'll gain a keen understanding of trends

in your organization and immediately spot areas where you can improve efficiency.

Choose an Open Platform

The cloud is open — maybe the most open platform ever — so start off right and choose a UC&C solution that's just as open. Make sure the application programming interfaces (APIs) work with the applications that are key for your business or industry and ensure the platform is widely used by the developer community.

Automate Processes

Wherever possible, eliminate manual work. As IoT and UC&C scale, efficiency is key, and manual processes are the root of most failures or slowdowns. To give machines a voice, you have to automate as much as possible.

Enlist the Entire Enterprise

Rolling out a solution as wide reaching as UC&C without buy-in from the troops will be a challenge. Trying to give machines a voice with the same approach will be nearly impossible.


TIP

Communicate early and often about the move to UC&C in the cloud and how giving machines a voice significantly enhances the life and productivity of everyone in the company.

Keep Moving, Keep Evaluating


REMEMBER

After you've gotten through the initial rollout, don't sit and admire your handiwork. Keep evaluating everything, ensuring the connections you intended are happening, uncovering missed connections and looking to future enhancements based on business conditions or user feedback. The key here is that there's no end state. Keeping your communications technology competitive is a constantly moving target, and you need to be ready to respond.

Give machines a voice with smarter communications

The Internet of Things (IoT) connects machines to each other, but those devices won't maximize the potential of IoT unless they're connected to the right people and workflows. Leverage data gathered by machines to make proactive business decisions and streamline communications from start to finish. In this book, discover how to improve efficiency, increase collaboration, and reduce costs by giving machines a voice.

Inside...

- Connect communications and IoT
- Foster team collaboration and productive workflows
- Get the most out of IoT with analytics
- Give machines a voice in your organization

Mitel®

Zeus Kerravala is the founder and principal analyst with ZK Research, a market research firm dedicated to the emerging technologies used to drive digital transformation. Kerravala provides a mix of tactical and strategic advice to help businesses of all sizes navigate an increasingly complex digital world.

ISBN: 978-1-119-50554-9
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