The Connected Mobile Workforce

Charting the Connected Field Service Employee

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Introduction

Today's communication technologies are far and wide, with commonly available technologies such as smartphones and tablets, but also newer technologies and trends, such as the Internet of Things, wearable devices, or self-driving cars.

As these new technologies take hold, the flow of information increases exponentially in nearly every walk of life, from home to school to the workplace. People are quickly becoming more connected to each other by the day.

For companies with mobile workforces, this evolving digital lifestyle creates opportunities for new heights of connectivity and productivity. Companies that embrace these technologies can now connect mobile employees with everyone in the service cycle in new and exciting ways. By replacing older technology with the latest smartphones, moving to device-agnostic applications, and connecting the field with back-office applications as well as directly to the customer, today's mobile employees have the potential to become more productive than ever. Moving forward, there is great potential for growth in productivity, customer service, and sales opportunities.

To take full advantage of today's technology, companies should look to future-proof their mobile workforces by acquiring the agility to adapt to whatever new environments they may encounter in business, in the field, and with customers.

> Connectivity holds the key.

By making mobile workforce connectivity the cornerstone of field service strategy, future advances— whether hardware, software or styles of working—will be easier to adopt and leverage.
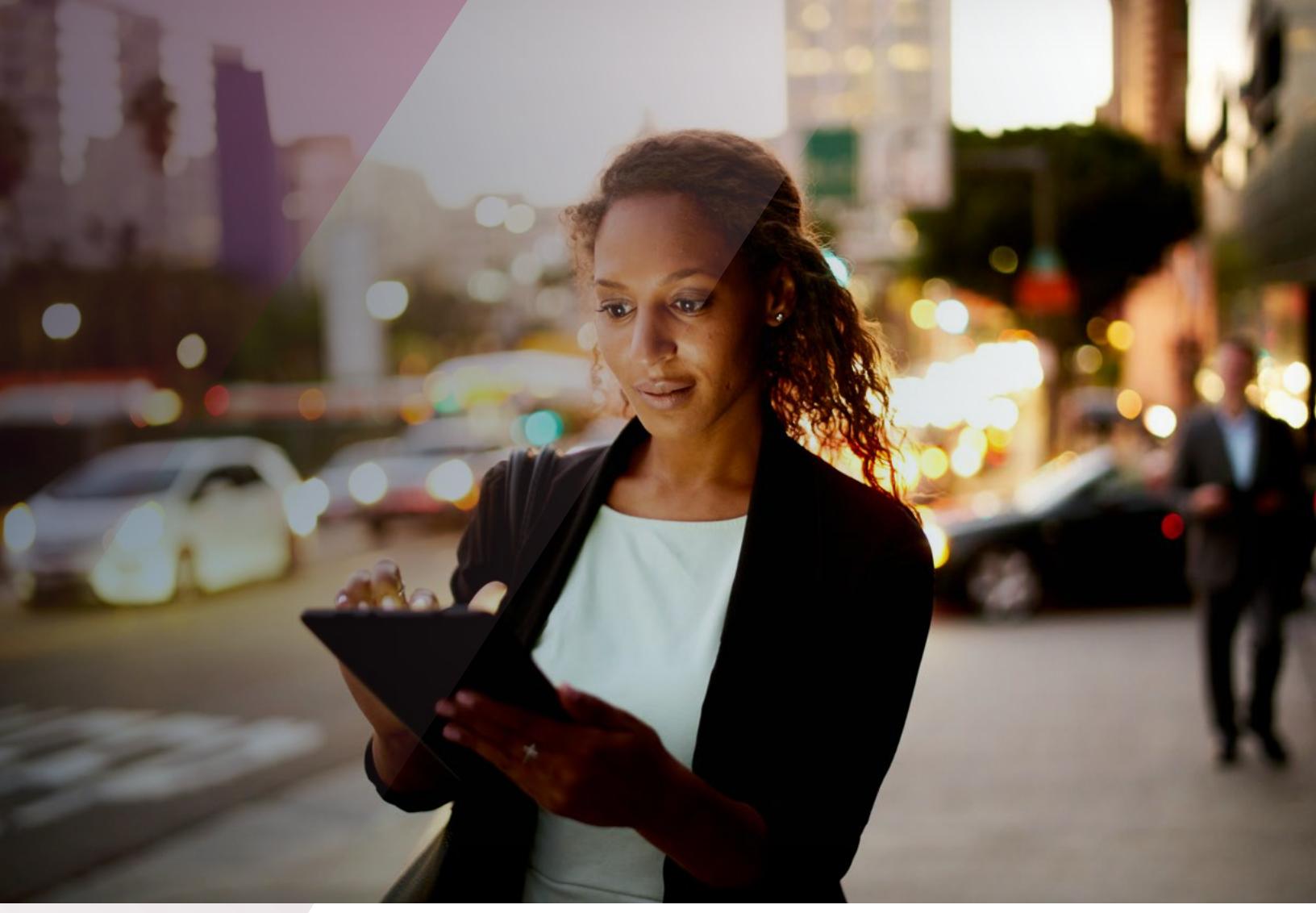
Evolution of the Connected Mobile Employee

The History of the Modern Field Service Technician

Not so long ago, mobile employees could only connect with the dispatcher, the back office, or the warehouse, either face-to-face, by phone, or by two-way radio. At the start of the day the schedule would be provided to the technicians, with little to no ability to update should any problems arise, i.e., misplaced equipment, incorrectly ordered parts or delays in the schedule.

Such limited communication capabilities meant little support and flexibility, and less certainty for the tech, the dispatcher, or the customer about how long jobs would take or when a problem would be resolved.

To accommodate for this lack of communication and technician enablement, field service organizations were forced to overstaff and overstock in order to have enough service capacity to account for any disruptions. Often, time was wasted, and customers were frustrated.

Fortunately, continuing advances in technology have broken this paradigm.

Trends That Broke the Mold

After several decades, the limitations binding field service management were broken. Consumer-driven technology trends ushered in a new world as bandwidth and mobile device capabilities exploded. New browser-accessible and cloud-based solutions were developed. The attendant rise of more powerful, convenient, and affordable portable consumer devices, and the advent of the HTML5 standard for the web, all led to a new era of connectivity and leveraging of real-time data that revolutionized the industry.
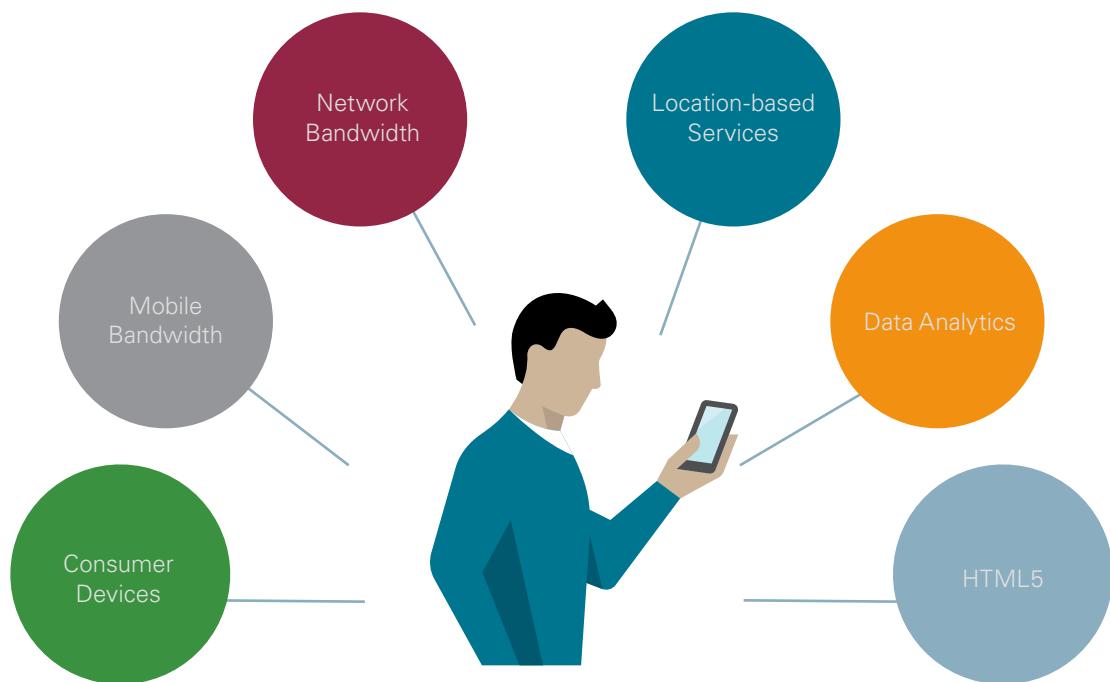

Figure 1. Consumer-driven technology has led to a new era of connectivity for the mobile field service worker.

Field technicians now have unprecedented power in the palms of their hands, which has enabled more accessibility and connectivity through the following technological advances:

- **Smarter Consumer Devices**
  Businesses worldwide have already moved toward the Bring Your Own Device (BYOD) environment. Instead of providing handheld devices for employees, businesses allow people to use the personal devices of their choice. This trend reduces a company's IT costs while freeing employees to use the tools with which they're most comfortable. Cloud-based, browser-enabled solutions have enabled this change in approach.

  Devices can instantly connect mobile employees to colleagues in the field, experts performing help desk duties who can answer technical questions, locate equipment, and do other tasks much more quickly and efficiently. The result is an increased number of first-time fixes and fewer repeat visits.

> In the world of field services, the most-popular devices—powerful smartphones and tablets—provide mobile employees access to real-time updated information about routes, scheduled jobs, and inventory requirements.

  These devices have also eliminated the need for paper and its associated costs. Customer contracts, quotes, and other forms are presented and stored within the device or, even better, in the cloud. Customers can sign for work electronically and have their information stored instantly in a customer record system, with an e-mailed copy instantly sent to them for recordkeeping. The digitization of paper continues to streamline workflows, increasing field service productivity.

- **HTML5**
  Advances in programming languages have dramatically increased the capabilities of browser-based software. HTML5, in particular, has allowed browser-based applications direct access to a system's hardware and is one of the primary enablers of the BYOD movement. For example, with a proper HTML5 framework, a web application can access device peripherals; allow full offline mode of browser-based apps; and access a device's Global Positioning System (GPS) or other location services functionality, allowing for resource tracking. HTML5 also allows ease of migration to new devices and enables easy access for contract and seasonal employees.

- **Enhanced Mobile Bandwidth**
  4G LTE is the latest enhancement in bandwidth and soon 5G will be the new standard. These enhancements enable access to far more useful and context-aware information to the mobile employee, allowing instant exchange of important information from text messages and documentation to streaming video and inventory exchanges. With this technology, video calls have become commonplace between techs, dispatchers, field supervisors, and remote support, helping to identify and resolve problems more quickly. With the increase in bandwidth limits, the technology like augmented and mixed reality will become the new standard for support, training, and troubleshooting.

- **Data Analytics**
  The combination of smart devices increases in network bandwidth and advancements in programming languages have allowed for the high-velocity collection of valuable field data. Workforce efficiency, business trends, and customer feedback—just to name a few—can now be measured in real time. The transparency created through advanced analytics supports business decisions that improve operations and gives companies a

> Today's connections save time and money as well as dramatically increasing the number of first-time fixes.

Today's Connected Mobile Employee

Advancements in smart devices, increased bandwidth, improvements in programming languages, and the advent of data-driven decisions have laid the foundations for today's connected worker. Thanks to this revolution in cloud-based technology and mobility, the mobile employee can now be connected to a much broader scope of resources—connections that save time and costs as well as dramatically increasing the number of first-time fixes.

More importantly, mobile employees are more connected to the customer. Today, they not only connect face-to-face but through the technologies that encompass all types of media—from the traditional e-mail and text to the use of social networks. Below are the points of connection for today's mobile employee, and the benefits that each connection provides.

Schedules and Job Information

Today's connected employee has instant access to updated schedules and job information, including:

- Location of the job

- Promised and expected arrival time

- Customer information

- Required tools and inventory

- Expected job duration

- Location of the next job (and subsequent jobs)

The schedule also indicates timing updates, including the impact of delays, reschedules, early completions, and cancellations. Users can connect through the schedule and see what's happening in real-time. This allows visibility into when events will occur and what actions, if any, must be taken to keep the schedule on track. For example:

- Field supervisors can see how their teams are doing against their assigned work, or who has the capacity to help a colleague

- Dispatchers can assign new jobs to mobile employees or reassign jobs in jeopardy

- Technicians can alert everyone in the service cycle if they have a problem or are falling behind schedule

Customers

Service appointments typically involve a visit to a customer who has to arrange their schedules to meet with a mobile field service technician. How long they are prepared to wait—and how they feel about a company as a result of the service—depends on:

• The value they place on the appointment. For example, most customers will wait several hours to have their internet connection or TV fixed but are less willing to wait for a smart meter installation that may result in a higher utility bill).

• How well informed they are kept about when the appointment will occur, as well as the ability to confirm, cancel or reschedule that appointment.

• Previous interactions with a field service company. For example, a customer's tolerance for waiting is affected by whether a previous appointment was accomplished early, on time, late, or was canceled.

Measuring and predicting when an appointment will take place and making that information available to a customer are both extremely powerful in improving and growing customer satisfaction.

Gathering customer feedback is critical post-appointment, which can occur:

• Immediately after the appointment to confirm that service is working. Collecting this information can reduce return visits and improve customer satisfaction.

• With a sample group of customers over time—gauging the overall performance of the field force and improving critical measures such as Net Promoter Score (NPS).

Finally, progressive field service organizations are using face-to-face customer interactions to enable the up-sell of additional products and services to their customer base.

> Basic sales training or event guided sales scripts through the technician's mobile device can help guide that technician through the up-sell process.

Colleagues

One of the most exciting capabilities of today's connected workforce is the ability to collaborate with other technicians. Inspired by social trends and driven by the ubiquity of mobile devices, field service technicians have the ability to connect with one another in intelligent ways, ushering in a new era of expedited problem-solving. Questions can now be directed from tech to tech, allowing for quicker problem resolution with little need to involve the back office.

> Like a tweet's hashtag (#) automatically providing the context of a 140-character message, with new mobile workforce technology job information can be tagged automatically, directing the message to the relevant people.

Dispatchers

The role of the dispatcher has shifted with all this technology as well; however, dispatchers still play a critical role in field service operations. Software-based technology and communication have replaced phone or text message conversations between mobile employees and dispatchers.

Just as field resources can now connect with their peers and colleagues in the field, a dispatcher can connect the same way. Resolving issues, changing job assignments, and updating status for jobs that haven't been completed or that have been canceled are done through asynchronous means. This allows a tech to respond when they are able and respond with the proper context regarding a question or status update. The communication method automatically provides the context for a job within both the message and the employee's application.

Field Supervisors

Connecting the mobile employee and the field supervisor to each other, as well as to an up-to-date schedule and customer satisfaction scorecard gives far more information and control to the field. Now the field supervisor can quickly and easily determine how the team is doing with their tasks for the day – and adjust schedules, calendars, and resource information as needed instantly. The connection allows each mobile employee to provide feedback or receive coaching to repair problems before they become serious.

Remote Expert Support

Remote expert support has become a significant driver of change in the connected mobile workforce. If a mobile employee cannot solve a problem alone or with the help of coworkers, he or she can present it—with context—to a group of remote experts, on video for real-time discussion and resolution. The immediate impact is a reduction in the number of times a technician gets stuck on a job, in essence increasing the number of first-time fixes and mean time to resolution. The same trend is expected to have a longer-term impact on the entire field service industry, by giving the mobile employee instant remote access to technical experience and knowledge, it will allow companies to consider other skills, such as sales, into their mobile workforce strategy.

Location Awareness and Tracking

Companies have used GPS devices to track the location of their vehicles and mobile employees as a safety precaution for years. Such technology provides visibility into how and where vehicles are being driven and allows for the monitoring of worker compliance. The advent of smart devices, increased bandwidth, and HTML5 has taken this concept to the next level; instead of tracking vehicles, companies and customers can now track employees directly from their mobile devices.

Companies can easily compare where a mobile employee is versus where they should be, whether they are at their destination or several hundred yards away from it. This technology can then generate warnings or notifications when the variations exceed defined limits such as time, distance, or other factors. Additionally, mobile employees can see which other jobs are near their current location if they finish a job early or see who on their team is close by and can help with a job.

> Location tracking information also allows the company to react quickly and effectively in the event of an emergency such as a network outage, where the nearest technician with the right skills can be quickly diverted to fix the priority issue.

Connected Mobile Employees: The Big Picture

Vectors and nodes of connectivity are as fluid as customer demands, competition, and advances in technology rapidly change. The real value of the concept comes not from how or to what a mobile employee is connected, but rather from the assumption that the mobile employee will always be connected. Entire businesses will change on the assumption that the field can access whatever back-end process it needs.

Therefore, placing connectivity as the cornerstone of a field service strategy prepares an organization for market or technological changes. The next section reviews current trends that may affect the mobile workforce, and how a connected worker is well positioned to take advantage of these trends.

The Future of the Connected Mobile Employee

The trends described above that created today's connected mobile employee are just the beginning. As Moore's Law predicts, the exponential growth of computing power—which translates into the power of the mobile device— and the bandwidth and connectivity of a mobile employee will grow in parallel. Increasing competition and economic pressure will put more demands on companies and the services they provide.

By implementing current best practices for a connected mobile workforce, companies will be well positioned to take advantage of several current trends gaining momentum, ranging from hardware such as wearable technology and self-driving vehicles to the Internet of Things (IoT).

Let's take a look at some of the current trends that really has the Field Service Industry buzzing.

Wearable Technology

Portability of technology has been an evolving trend for the past 20 years. From the home PC to the laptop to the mobile phone and currently the smartphone, technology has not only gotten smaller but virtually morphed into an extension of the human body. The practical applications of wearable technology like augmented reality (AR), the smartwatch or their successors could prove to be extremely beneficial to connect mobile employees.

- **Freedom.** Wearable technology allows mobile employees to complete freedom of movement, without losing access to important tools.

- **Enablement.** Wearable technology enables the use of augmented reality which could offer the guidance employees need at each step of problem diagnosis or installation. This increases productivity, reduces mistakes, and potentially equalizes the skill levels. The result will be the completion of a greater number of jobs and improved customer satisfaction. As wearables become more commonplace, AR could be used by customers to troubleshoot and fix their own problems, saving the company time and resources.

- **Collaboration.** Wearable technology enables connectivity with remote subject matter experts (SMEs) and allows them to engage in the field experience directly. Remote SMEs will see what the technician sees and can help guide a mobile worker through difficult tasks.

Self-Driving Vehicles

The self-driving vehicle trend started with simple features such as lane warnings and parking assistance and has now expanded to the brink of full driverless functionality being legalized in some major urban areas. The statistics of this technology are compelling in terms of accident reduction, but also in improved vehicle economics. With the real potential of self-driving vehicles becoming commonplace, implications for the connected workforce cannot be underestimated— the vehicle itself becomes another vector of the connected workforce.

Impacts include:

- **Efficiency.** Programmed to take the most efficient routes, driverless vehicles will eliminate human error in travel time. Vehicles can make immediate route adjustments based on schedule changes, potentially even before the mobile employee knows that an adjustment has been made to the schedule. From a mobile worker perspective, the self-driving technology can help reduce the stress of driving in stop and go traffic and provide them the needed time to research issues for their upcoming calls.

- **Cost reductions.** Improved performance of driverless vehicles over human drivers will potentially lead to cost savings in fuel, vehicle wear, and travel time. Companies may also see a decrease in insurance costs associated with such vehicles on the road.

- **Synchronization.** When vehicles are equipped with information such as appointment start and stop times, as well as the tools and equipment required for a particular job, the one-to-one connection between tech and vehicle can be broken. The new field force will consist of smaller fleets of driverless vehicles arriving at locations only when they are needed, dramatically reducing the overhead of operations across staffing, fleet management, and inventory.

The Internet of Things (IoT)

The mobile employee is connected to an ecosystem of technologies and business process that will forever change how the employee operates in the field. Yet these elements are also be connected to each other. This includes equipment installed throughout a company's infrastructure or even at a customer site.

Everything will be connected to the internet in what is being called the Internet of Things (IoT). IoT is already having a direct impact, transforming the following areas:

- **Speed.** There will be no delay between the time a problem is discovered and the time it takes a service company to dispatch a field service employee. Field service technicians can arrive at a job even before a problem has occurred. Critical information regarding customer support will be fed to the workforce in real time.

- **Customer expectations.** Machines will phone the customer's home if experiencing or anticipating a problem. As a result, customers will expect the field service team to be aware of any problems as soon as they occur, and what's more, to take immediate action. Customers will benefit from having problems repaired even faster, or sometimes before the product breaks down at all.

- **Visibility.** Not only will field service organizations be instantly aware of when a fault occurs in the field, but they will also have a more definite diagnosis of the problem. IoT will continuously provide real-time information on the performance of each asset in the field, enabling the right technician with the right parts and the right tools to be sent to the appropriate job.

In addition to technology as a driver of change, there are also a number of industry and economic forces that will have an impact on the mobile employee of the future.

Dispatcher-Less Connected Mobile Employees

With more information comes the wherewithal to make more informed decisions at a faster rate. Mobile employees simply need empowerment to make decisions.
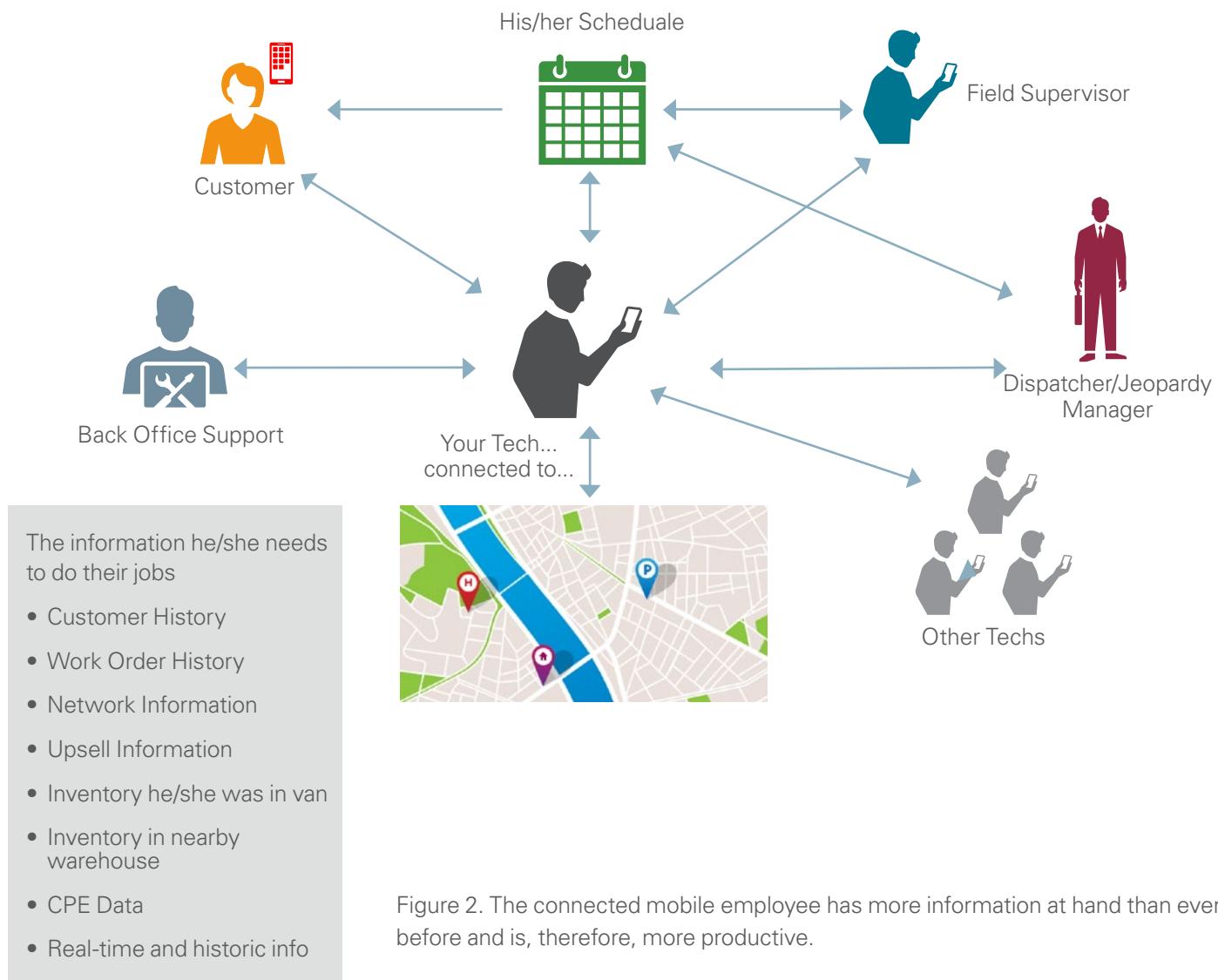
Mobile workforce management tools are giving organizations an air traffic control–like level of field visibility. This visibility permits a shift from a regionalized dispatch—with a ratio of dispatchers to mobile employees typically in the region of 1:8 to 1:12—to a centralized dispatch where dispatchers are typically handling 30 or more mobile employees.

Gradually, however, with that same information more readily available and digestible, dispatch responsibility will move from centralized teams out to the mobile workforce. Over time, field supervisors and even peer-to-peer relationships between mobile employees will resolve jeopardy situations and other issues currently handled by back-office management.

Diversification of the Mobile Employee

A number of companies with a large mobile workforce are finding that they have less work for the field force. For example, businesses whose core activity was to deliver letters have experienced a reduction in demand in the age of e-mail and social media. Traditionally, the answer has been to downsize or right-size in whatever way seems most effective. However, the connected workforce presents another possible solution.

For organizations that have already made massive investments in a mobile workforce, the connected workforce will allow for a dramatic expansion of service offerings, with many companies exploring ways to assign other tasks to mobile employees once at a job site. These tasks do not necessarily need to be related to a particular organization's primary business. For example, a local cable provider may both read a meter and deliver a package while visiting a home. This increased value of the mobile workforce can generate new revenue streams through the execution of noncomplex fieldwork—a concept often referred to as "picking up pennies."

His/her Scheduale

Customer

Field Supervisor

Back Office Support

Dispatcher/Jeopardy Manager

Your Tech... connected to...

Other Techs

The information he/she needs to do their jobs

- Customer History
- Work Order History
- Network Information
- Upsell Information
- Inventory he/she was in van
- Inventory in nearby warehouse
- CPE Data
- Real-time and historic info

Figure 2. The connected mobile employee has more information at hand than ever before and is, therefore, more productive.

For some organizations, there is a need for a blended workforce. Meaning, they have a mix of full-time mobile employees and contingent workers from independent 3rd parties. While other organizations rely solely on 3rd party mobile workers to support their customers, these workers are not "badged" employees but are contracted to do work on behalf of the organization that retained their services. Because of the improvements in mobile technology, this work model can thrive, so long as a mobile worker has a smart phone, they will be able to accept work and do work on behalf of multiple organizations. With access to the information they need, these mobile workers can become experts on the fly and will allow them to work on a variety of different products and equipment.

New Types of Mobile Employees

The connected workforce enables new field services that were not possible or cost-effective until recently, allowing other industries to join the ranks of mobile workforces. The UK's National Health Service, for example, is now placing a far greater emphasis on "care in the community" rather than care in the hospital. While fieldwork has always been an aspect of the healthcare industry, this trend is making it much more widespread and closer to the core of what the healthcare industry provides. This adds an urgent new dimension—literally one that is a matter of life and death—to the mobile employee, far beyond the usual factors of convenience and customer satisfaction.
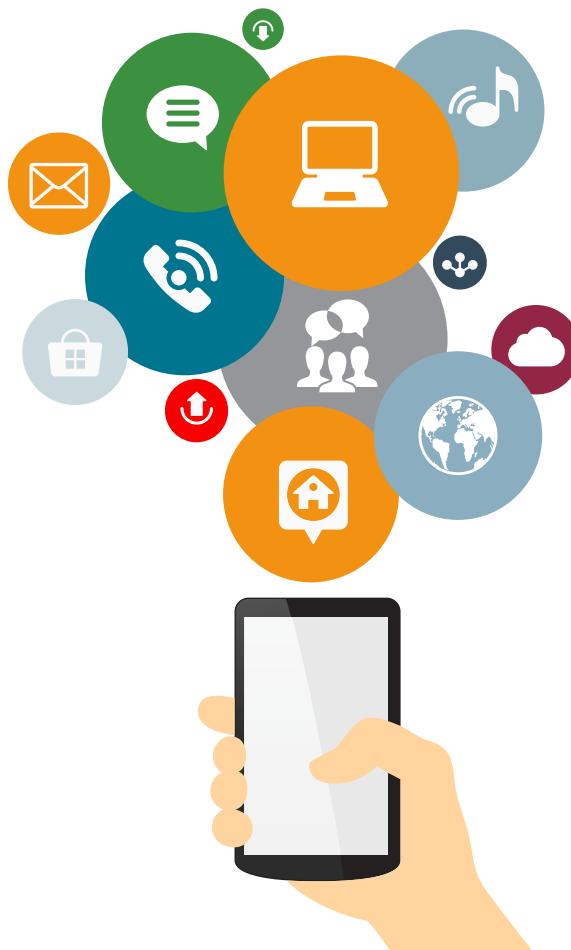
Conclusion: Future-Proofing the Mobile Employee

The connected employee is a recent phenomenon that's changing the way pioneering companies think about their mobile workforces, and these companies are already reaping the rewards of the connected workforce. The best way to join their ranks and future-proof your workforce is to make connectivity the cornerstone of a field service strategy.

Start by creating some of the connections powering today's mobile employee. Once these connections become ingrained in your business processes, adding new connections will create minimal disruption, and field service organizations will be well poised to reap the benefits of each new connection.

The increased flow of information back and forth from the field and the ability of devices to process and display that information in useful ways puts the connected mobile employee in a new position of having access to all the information and support needed to make the best decision for the company. As companies realize this and empower their field employees to take advantage of the new reality, there will be a change in roles and a shift of power from the back office to the field.

With smartphones as the new standard, moving to device-agnostic applications, and connecting the field with back-office processes as well as the customer, today's mobile worker is more effective and productive than ever.

Technological advances like wearable tech, AR, and IoT will further enhance the connected mobile worker's role. Companies that implement best practices today will be best positioned to take full advantage of these future trends. In addition, new industries will develop mobile workforces, while longstanding industries such as healthcare will continue to expand into new field services. All will be driven by new advances in technology that solve unique business problems.

> For those companies that already have a mobile workforce… This new power of connectivity and technological advances in communications present exciting opportunities to optimize and inspire their workforces to new heights of productivity.

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