SOTI®

ENTERPRISE MOBILITY MANAGEMENT

White Paper

Keeping the IoT "in-service"

Field Services in the era of the Internet of Things

A decade ago, field service organizations were early adopters of mobile technology, and now they are quick to embrace the Internet of Things. Exciting new technology such as smart machines, augmented reality and connected vehicles are revolutionizing the industry. But they, and the IoT in general, are creating many new challenges. Issues of scale, diversity, interoperability and security make it more important than ever to deploy an endpoint management and security solution.

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Use of Mobile Technology in Field Services

> **58%**
> **of field service organizations are deploying COBO, 10% are using COPE and 11% are using BYOD*.**

Based on its core business — the service and repair of infrastructure, machines, and equipment — you might think that the Field Services industry is slow to adopt new technology. The industry's rapid adoption of mobile technology has shown this to be untrue. It is hard to imagine how field service organizations managed their business before mobile phones (and pagers) came along to enable real-time communications with technicians in the field. Many field service organizations are on their third generation of mobile device deployment, having pioneered mobility almost a decade ago with rugged devices running Windows CE.

What mobile devices are field service organizations using to support their business and how are they deployed? According to a 2015 survey by Field Mobility*, there are many device types and form-factors in use; 41% use smartphones, 37% use laptops/notebooks and 22% are using tablets. Deployment models are also varied - 58% of field service organizations are deploying mobile devices using a corporate-owned, business-only (COBO) model, 10% are using corporate-owned, personally enabled (COPE) and 11% are using BYOD, while 21% use multiple models.

On the decision whether to deploy consumer grade or ruggedized devices, the same survey* sees consumer-grade smartphones and tablets edging out ruggedized models. This result is contrary to dozens of Total Cost of Ownership (TCO) studies published over the last several years that claim rugged devices have half the TCO of consumer-grade devices.
Possible reasons for this discrepancy include:

- more robust consumer-grade smartphones and tablets
- increased price difference between rugged and consumer-grade devices
- superior user interface, app selection, user experience and connectivity of consumer devices

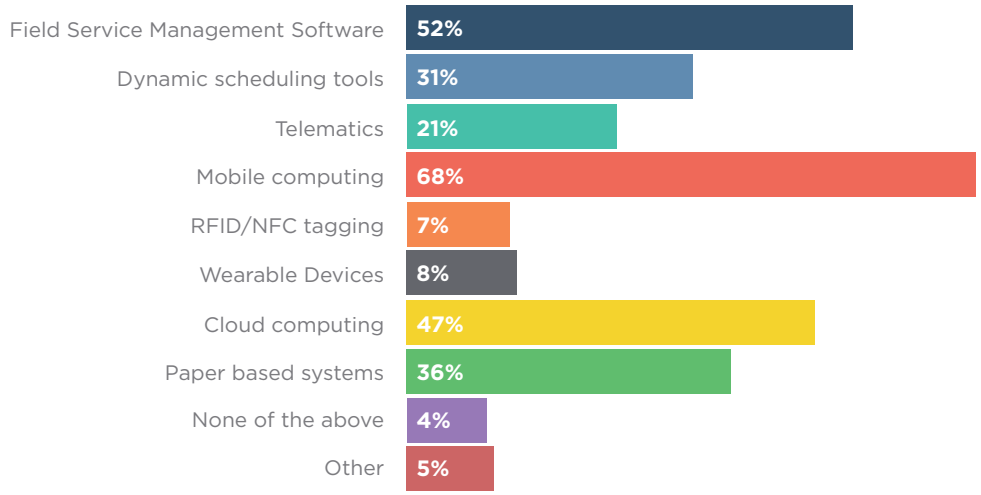
Based on their own experiences, one of SOTI's customers suggests another reason for this discrepancy – users take care of consumer-grade devices better than rugged devices. They have seen that the break-rates of consumer devices is half that of rugged devices, and this number drops even further for personally enabled consumer smartphones and tablets. This means that despite all the TCO studies, break-rate and downtime may not be a major factor in the decision of consumer-grade vs. rugged device.

*Field Mobility – 2015 Special Report

Beyond basic communications (voice, text and email), how are field service organizations using mobile technology? According to a 2015 survey by Field Service News*, the primary application being used is Field Service Management (FSM) software. They found that 52% of companies are using FSM software to coordinate their field operations and manage their mobile workforce, while approximately 36% are still using paper based solutions for their operations. The activities and tasks that are most likely to be automated are;

- work order management (including assignment & dispatch)
- call scheduling (including routing and navigation)
- back end system integration (knowledgebase, customer records, parts and inventory)

> The global Field Service Management software market is expected to double to **$5.11 billion** USD by 2020.**



* Field Service News, 2015

** MarketsandMarkets, 2014

> Mobile technology can improve the productivity of service organization by 30-40% and their **profitability** by 20-25%.*

The Benefits of Mobile Technology

The Field Service industry was revolutionized by the arrival of real-time communication between the engineer in the field and the manager in the back office. It simplified work order assignment, scheduling, routing/navigation, technician visibility, and customer communications. Taking mobility to the next level, deploying powerful mobile devices, applications and content will continue to transform the industry and deliver real benefits.

Exceed Customer Expectations

GIS and Real-time Location Systems (RTLS) deliver improved transparency to the customer – providing more accurate estimates of arrival time. Mobile devices improve customer communications and add the capacity to bill and/or pay immediately.

Reduce Costs

Geographic Information Systems (GIS) help Field Service agents navigate to customer locations faster, and more efficiently. This will reduce downtime, fuel costs and vehicle maintenance requirements.

Improve Productivity

Workers have the tools they need to do the job right the first time. (customer history, worksite notes and photos, job description, schematics, and manuals) Mobile workers are productive no matter where they are or when.

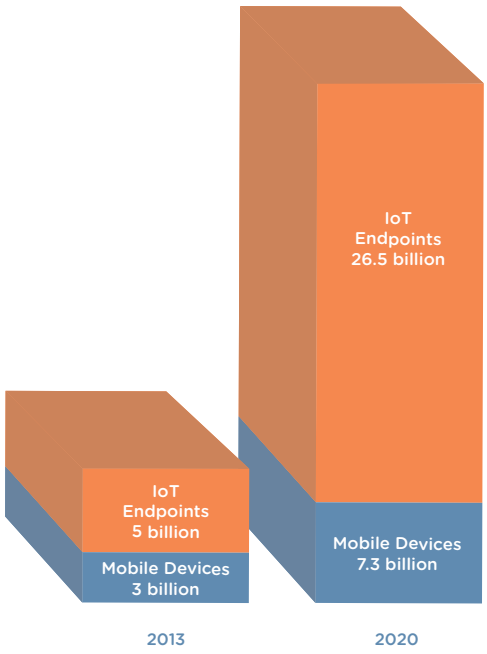
Mobile devices have become a core component of successful Field Service organizations. They provide real quantitative and qualitative benefits to the organization. But what are some new technologies that will have a similar impact on Field Services over the next five to ten years?

* RapidValue Solutions, 2014

The Impact of the Internet of Things

There are many exciting technologies starting to influence the field service industry. Some of the most notable are; Big Data, 3D printing, connected cars, and most importantly, the Internet of Things. According to Field Service News*, over half (55%) of Field Service organizations believe that the IoT will become a "fundamental part" of their operations in the future, while 21% went even further and stated that the IoT is a "critical" strategic requirement.

> McKinsey estimates that B2B uses will generate nearly **70%** of potential value enabled by the IoT*



Across all regions and industries, experts agree that the IoT is going to grow exponentially over the next few years. Gartner*** projects that by 2020 , in addition to 7.3 billion mobile devices (smartphones and tablets) there will be over 26.5 billion connected IoT endpoints globally. Other analysts think this number is conservative, and we could see up to 100 billion connected endpoints, sensors and devices. These endpoints will be used in hundreds of different products and solutions; from simple smart meters to entire buildings and cities. What are some of the IoT devices and related technological advances that are expected to have the biggest impact on the field services industry?

* Field Service News, 2015
** McKinsey and Company, June 2015
*** Gartner, 2013

> Predictive maintenance can reduce overall maintenance costs by 25%-30%*

Smart Machines

Smart machines include embedded sensors that can monitor mechanical data during operation; run time, temperature, vibration, pressure, fluid levels, and air/water flow. These machines can report this data back to the equipment vendor to deliver insight into machine performance. They can also create an alert when the machine is not operating optimally. According to a report from the Aberdeen Group*, more than half of "best-in-class" equipment is connected for the purposes of asset management and remote monitoring. But how do smart machines improve equipment maintenance?

Over the last 20 years, field services organizations have moved away from the more disruptive practice of reactive maintenance and repair, to a regular schedule of preventative maintenance. This transformation has improved uptime and decreased the likelihood of catastrophic equipment failure. Smart machines take this transformation one step further – reporting key operating data back to the manufacturer, where experts (human or machine) can analyze the data and verify normal machine operation. This makes it possible to move away from an arbitrary maintenance schedule based on days or months, to true "predictive" maintenance based on real machine data, i.e. vehicle mileage, hours of operation, pump cycles, or lubricant viscosity. Smart machines can detect performance degradation, forecast glitches, and then upload recent operation data to initiate a service call.

* Aberdeen Group, July 2015

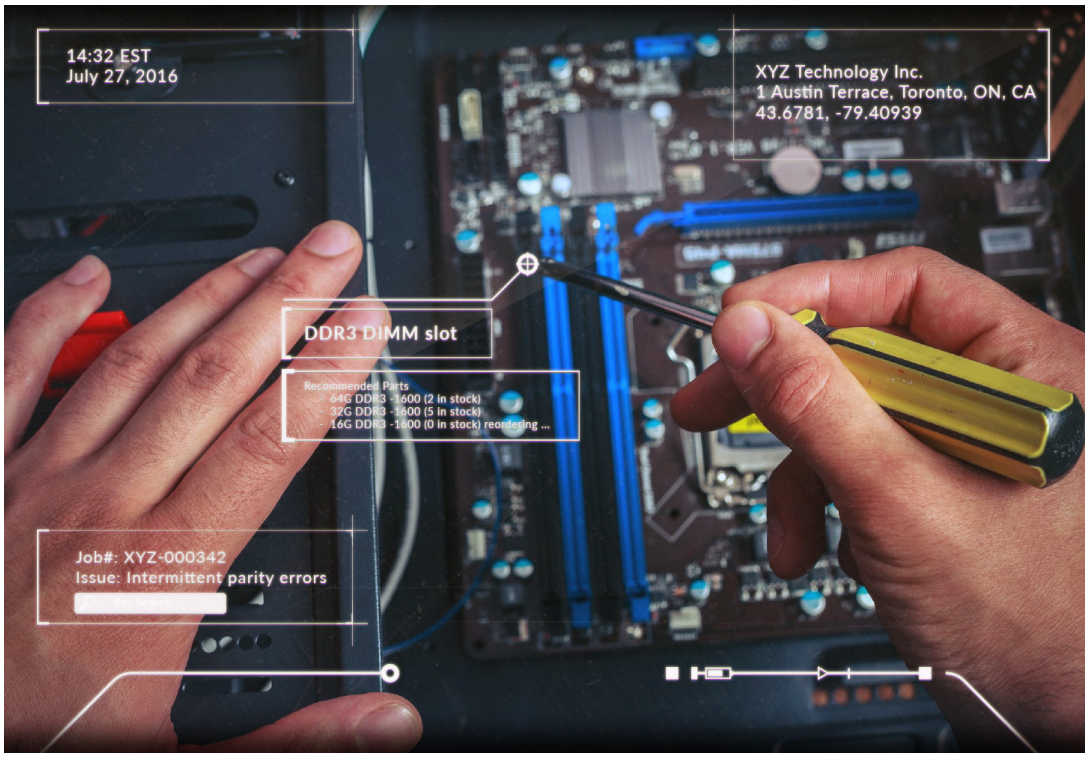
“Augmented reality market is expected to grow from $ 1.72 billion (USD) in 2014 to over $56 Billion by 2020.*”

Augmented Reality

It is important to understand the difference between Augmented Reality (AR) and Virtual Reality (VR). Oculus Rift™, HTC Vive™ and Google Cardboard™ are popular VR technologies. They use sound and images to immerse the wearer in an environment completely separate from the real world. VR is mostly targeted at entertainment and leisure purposes, for example film, music and gaming. Augmented Reality is different. It overlays digital images and data onto the existing reality. Most commonly, it enhances the user's senses and delivers meta data relevant to wearers current environment. Google Glass™, Microsoft HoloLens™ and Vuzix Smart Glasses™ are relatively well known AR products.

Augmented Reality has the potential to change the way Field Service companies operate in a fundamental way. Getting qualified, experienced staff in front of the customer equipment quickly and cheaply is one of the main challenges of field services. AR solves this problem. It makes it possible to leverage the skills and experience of the senior engineer on-site without them actually being there. Augmented reality enables more effective communications between the HQ and the technician on site, supplying real-time voice, video, schematics and animated walkthroughs. An AR channel to the senior engineer at HQ lets you dispatch a less experienced engineer who is closer to the job, or even utilize the customer to investigate and fix the issues.

Field Service organizations are dealing with a demographic time-bomb. The average age of their senior Field Service technicians is approaching retirement, and soon companies will lose these valuable resources with their years of experience. AR can leverage these diminishing resources and help mentor new technicians more efficiently and effectively.



* MarketsandMarkets, November 2015

Connected Vehicles

An IoT technology that has received a lot of media attention is the connected car. Google™ and Tesla™ have been testing the concept for years and the first vehicles with "assisted driving" features are now available for purchase. Semi-autonomous vehicles are exciting, but the potential of a connected vehicle extends much further than assisted driving.

> "Connected car penetration is expected to reach almost 28% of the US by 2020, resulting in a market volume of over $21 billion.*"

Vehicle Management Systems (VMS)

Provides access control / ignition lock for your vehicles and tracks who is using them and how they are being used. VMS can report on vehicle performance, fuel consumption, and driver behavior to allow companies to manage their maintenance schedules better as well as reduce downtime and operational costs.

Geographic Information Systems (GIS)

Deliver real-time location information about the vehicle and warns the driver about traffic hazards and bad road conditions. Based on this data, it can calculate optimal routing and job schedules to reduce fuel costs and improve technician utilization.

Driver Safety Systems

Employ features like "velocity locks," and driver fatigue detection to ensure the safety and well-being of the driver. Advanced systems can even take control of the vehicle in heavy traffic, help park the vehicle or brake in the case of an emergency obstruction. These systems keep workers safer and can reduce insurance costs.

These are just a few of the beneficial applications of IoT technology for connected vehicles. As the technology moves from the test track to the streets, each industry and every company will pursue the most practical application that fits their unique situation.

* Statista, 2016

The Future of Field Services

In addition to the new technology, the IoT is creating entirely new markets that will require ongoing service and maintenance. For example, Smart Cities will see integration of the IoT into municipal infrastructure and assets. The goal is to make cities more comfortable, energy efficient and safe. Smart Cities include exciting new technology such as smart utility meters, intelligent trash cans, and autonomous street sweepers. Imagine sensor-enabled utility poles that can analyze traffic, report available parking spaces and monitor the environment (temperature, noise, precipitation, and air quality, etc.). Smart Cities will see millions of endpoints and create thousands of potential applications in millions of locations, and even the smallest, simplest solution will require field service at some point.

> "The global market potential for Smart Cities is projected to reach **$1.2 trillion** by 2020.*"

Another exciting development is the growth of smart machines into the consumer space. Many of us have read exciting things about smart refrigerators and other intelligent appliances. Less sexy, but more practical are intelligent home HVAC, furnaces and boilers that include embedded sensors to monitor efficiency and performance, as well as detecting critical failure states like carbon monoxide emission. It doesn't matter whether the smart equipment is in your kitchen or your basement, at some point it will require service. Consumer smart machines will change the nature of the service call — technicians will plug their mobile device into the smart machine via a standardized on-board diagnostic interface, analyze the condition of the equipment, read the error code and fix the problem. Service calls will be faster, with a higher likelihood of a first-time fix.

One more trend changing the field services business is "Servitization" — moving a company's business model from the traditional sales-centric model to a service-centric one that includes uptime/performance guarantees and Service Level Agreements (SLA). Servitization will create more revenue opportunities for field service, but performance and customer satisfaction will become more important than ever.

* Global Industry Analysts, 2016

Challenges due to the Internet of Things

> Hacked CCTV security cameras were responsible for the world's largest DDoS attack — bombarding an internet security company's website with almost 1.5 Tera bps of data

Like any new technology, the IoT is creating plenty of new challenges — especially since we are in the early days. There are challenges around scale, interoperability, security and management. Field service organizations are used to managing different makes and models of smartphones and tablets as well as different operating systems, but are they ready for the incredible diversity and complexity of all these new IoT endpoints? New operating systems, low-power "IoT-ready" networks, and optimized messaging protocols need to be understood and considered as companies deploy new machine to machine solutions.

New security concerns

The IoT has created a lot of concerns about security. A lack of dominant standards and a general "get-it-on-the-market" attitude has led to security breach after security breach. Even the mainstream media is picking up on it as IoT devices are being hacked and incorporated into botnets for massive DDoS attacks. And if Ransomware on pacemakers and hackable cars wasn't concerning enough, the proliferation of smart machines into industry could be the stuff of nightmares. Imagine the damage a hacked pump in a nuclear power plant could create, or if that sounds unlikely, a simple man-in-the-middle attack can hide performance degradation and an imminent failure state. Maybe this is science fiction, maybe not — but the reality is that more endpoints and more connected machines make data breaches much more feasible. IoT security needs to be considered and built into your deployment from the beginning, not bolted on at the end. It needs to be managed and maintained for the entire lifecycle of the endpoint — IoT security is a journey, not a destination.

Interoperability is required

IoT scale and diversity work together to create another issue to contend with, interoperability. How will endpoints, controllers and software solutions from different vendors work together? What messaging and management protocols will they use? There is no clear answer yet. As with any new technology, there are many vendors selling not just their endpoints and software, but their entire ecosystem - they want to lock you in for the long term. The good news is that there are often open source alternatives to proprietary IoT solutions — everything from operating systems and middleware to messaging protocols and platforms. The industry will experience some standardization going forward, but until it does you are going to need a mobility management solution that can secure and manage all of these diverse devices and endpoints.

Going beyond Unified Endpoint Management

Field service organizations were early adopters of mobile devices, and also quick to realize the benefits of mobility management. It started with Mobile Device Management (MDM) — solutions that were focused on securing and managing mobile devices. Then, as device capabilities grew, and mobile applications and content became more important, the focus expanded to enterprise mobility management (EMM). For field services organizations, this meant making it easy to deploy and update FSM solutions, managing critical content and using remote support to fix device problems in the field. Now, with the arrival of IoT, the field service industry is adapting yet again — but one thing remains constant. There may be dozens of new categories of devices, and millions of new endpoints, but they will all need to be secured and managed from a single, unified endpoint management (UEM) solution.

Mobile Device Management (MDM)

MDM is the industry term used in the early days of enterprise mobility for the security and management of mobile devices, including: smartphones, tablets and special purpose, ruggedized devices.

Enterprise Device Management (EMM)

EMM is the industry term for the management of mobile devices and their applications, content, and security. It goes beyond MDM by adding management for device ownership/deployment models, data at rest, data in transit, and wireless network connections.

Unified Endpoint Management (UEM)

UEM is the evolution of EMM in response to IoT. A UEM solution enables enterprises to secure and manage all business endpoints; from legacy mobile devices and PCs, to all of the new IoT endpoints, sensors, and systems.

SOTI delivers Mobility and IoT Management for Field Services

SOTI has been managing mobility for two decades. We managed dedicated-purpose mobile devices before smartphones were introduced, and now we are leading the way to UEM and making the IoT manageable. We have a proven track record of delivering powerful, easy-to-use mobility management solutions for field services. No matter where or how a device is used, SOTI MobiControl does it all: endpoints, applications, content, email and security are all managed from a single, unified interface.

SOTI is a proven product innovator and EMM Industry leader. Over 16,000 customers across 170 countries rely on SOTI for their EMM needs. We empower the enterprise to take mobility to endless possibilities.

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