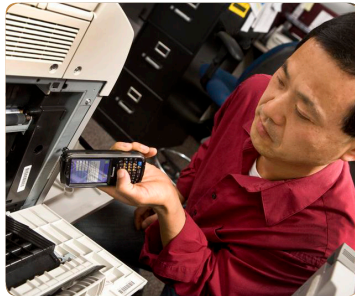
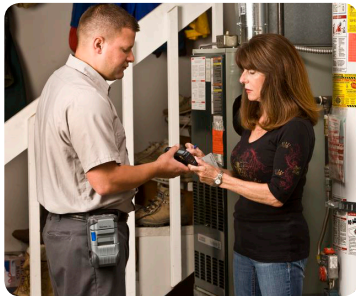
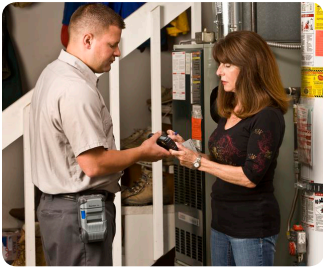


Field Service

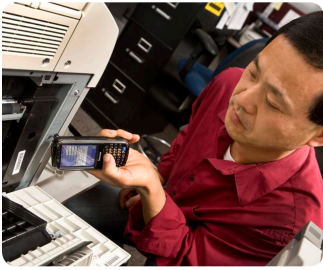
Deployment Environment Guide





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Preface

This “Deployment Environment Guide” is intended for the use of Intermecc and Channel partner staff that are preparing to call on Field Service organizations. This guide is not a quick white paper; the goal is to provide a comprehensive review of Field Service organizations and applications so that sales staff have enough knowledge to feel confident calling on customers in an industry where they may not have prior experience.

After reading this guide, you should be familiar with:

- Environment terminology
- The typical job roles, applications, and tasks involved
- Common problems and challenges encountered, with emphasis on those that can be addressed by Intermecc
- Specific interests of the three buyer types (Economic/Business, User, and Technical)
- Industry segmentation
- Market trends that are driving change

This guide cannot teach you everything about Field Service, but it will give you enough information to engage in meaningful application conversations with your customer.

Environment Overview

Field Service organizations service equipment located on premise at the customer site. This occurs with equipment or other resources that cannot be shipped to a service depot. Services may be performed by the manufacturer, by a contracted third party, or by the user’s own internal resource (such as banks servicing their own teller equipment). Services are carried out by Field Technicians, also known as “Repairmen”, “Service Technicians” or simply “Techs”.

Field Service appointments include installation services, periodic equipment checks (preventative maintenance), and breakdown repairs. In all of these cases, a technician is dispatched to address the issue. Depending on the type of service call, a technician may be scheduled days, weeks, or months in advance. In critical situations, they may be required to respond to a same day service call. Scheduling service calls and balancing Field Tech workloads is the responsibility of the Dispatcher.

Prior to automated systems, companies used dispatch “boards” to track work assignments. These were typically corkboards mounted on a wall where Dispatchers could post paper tickets under the name of each technician. Before cell phones, pagers were used to notify Field Techs of new work assignments. They would need to search out a public phone or borrow a customer phone to call into the dispatcher for the work order details. Their hand written notes from the call could be incorrect or incomplete, requiring the tech to place a follow up call. Dispatchers had little information about the progress of each technician, relying on the Techs to call in periodically for updates.

Today’s automated systems have changed all this. When customers call in for service, their current information is added to a database containing historical information about the account, its assets, the contacts, previous service call event, etc. This means scheduling decisions can be made on the spot with a great degree of accuracy.

Technicians carry mobile computers capable of displaying all the information about each service request. They can access any technical information, view history on the asset, scan parts used during the repair, collect signatures, and print bills/receipts onsite. Dispatchers can track the progress of these activities and move jobs from one tech to another with the slide of a mouse. Supervisors also monitor technician activities to provide support when needed.

It is common for a service organization to see a 30% or greater increase in productivity by moving from a manual/paper environment to an automated solution that provides technicians with the information they need at the time of service. This does not even take into account the financial advantages of parts tracking, taking payment at the time of service, or enabling the technician to sell maintenance contracts through the system. In addition to improved financials, companies that automate their field service processes report an increase in customer satisfaction.



The next section of this document gets into the details of the workforce management processes, benefits and requirements of an automated field service solution. We will take a close look at every step in the day of a life of a service order and point out opportunities for a service organization to improve productivity and gain workflow efficiencies by automating their processes. By the end of the section, you will know the points to make and the questions to ask during your next session with a service management executive.

Detailed Environment Description

Types of Service calls

Generally speaking, in the field service world there are two types of service events; installation activities, where the equipment is installed or upgraded, and service calls when the equipment breaks down. Service calls can be further segmented into routine service activities and unscheduled repair service events.

Routine service calls include scheduled services and Preventive Maintenance (PM) calls. These types of service calls are typically pre-scheduled days, weeks, months, or even years in advance depending on the purchase arrangements and maintenance contracts established with the customer. For example, a three year PM contract on a commercial air conditioning system will show monthly appointments on the Dispatcher's calendar for the full three-year period.

PM calls are typically handled as lower priority work, and are often used as "filler" activities between higher priority repairs. However, in some cases, such as high-end medical equipment or aircraft engine maintenance, PM activities must given a high priority.

Routine service calls not related to equipment maintenance are also prescheduled over an extended period. Examples include monthly document shredding service, weekly lawn care, or hourly security checks.

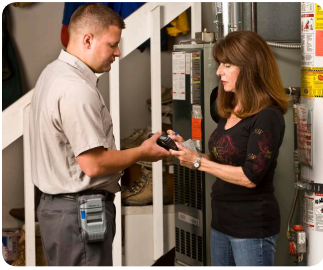
Note: Companies conducting routine service work have simplistic requirements for mobile computing automation since service activities seldom change (i.e. there may not be a requirement for wireless communications with this workforce).

Repair service calls (more often referred to as just "service calls") are unscheduled events that need to be addressed when a piece of equipment is having a problem. It might be a failed refrigerator or furnace, an aircraft engine problem, a phone or cable system issue, or an IT server that has gone down. It could even include dispatch of a fire crew. These types of calls are often ranked by severity and given a higher priority than routine service events. In some cases, these calls require an immediate response – fire, police, and even gas leaks fit this category.

Note: In early discussions with prospects it is important to get a sense for the breakdown in the types of service calls and workers they manage. They may, for instance, segment their workforce into highly skilled service techs and lesser skilled PM techs, where service techs require a high-end mobile computer and PM techs can get by with a low-end device.

Starting the Service Process

The service call process begins when the call center is contacted by the customer. The call center is responsible for answering customer calls and responding to inquiries. The initial goal of the call center is to troubleshoot and resolve the issue over the phone. If they cannot resolve the problem and must send a technician on site, they collect as much information as possible to facilitate the technician visit. For these cases the call center generates a service order or work order. In some cases, the issue is urgent enough for the service organization to respond the same day or within hours of the time the call is taken (an example is a grocery store with a commercial freezer problem). Same day work orders are also offered as premium service contracts by companies providing improved response times (i.e. ISP (Internet Service Provider) promising same day or 2-4 hour commitment times). Many companies try to avoid same day work because it creates inefficiencies in the route (such as sending a technician across town to fix a broken freezer).



If the service call is not “same day,” a work order is used to initiate routing for the visit. Large organizations may divide routing and dispatching responsibilities. Dispatching involves sending work to Field Technicians including same-day work orders. Routers are responsible for sequencing a technician's prescheduled work and setting up future appointments so that they fit within an efficient route. A good example of complex routing is a waste and recycling company determining the stops to be made for a garbage truck route. They must determine stops based on the location in the route, the side of the street (i.e. they must be sure the trash bin is on the right side of the vehicle), and the type of vehicle required (roll-off, front loader, side loader).

In order to schedule an appointment, the organization must know when a Tech is available and how long the call should take. They also take into account skill level to ensure the Technician is qualified to make a repair. Field Technicians will sometimes refuse a new work order if they know they do not have the skills to complete the repair, or if their schedule will not permit them to work the order. In cases where a Tech refuses a call, he/she must provide details to the Dispatcher as to why he/she cannot take the call.

The estimated call time is critical when building a Tech's route for the day; best-in-class companies will have sophisticated systems for estimating repairs. Estimates are often padded to allow for unforeseen delays (i.e. traffic, lengthy repairs, and difficulty accessing the equipment).

Operations that have not been automated (using mobile computers to manage work orders) will print out work orders for Field Technicians to pick up. In this case, Techs must start their day from the service depot to check in with the dispatcher and pick up their work for the day. In some cases (i.e. railroad crews), work assignments are collected for an entire week in advance since they travel long distances and often stay somewhere locally while on the job.

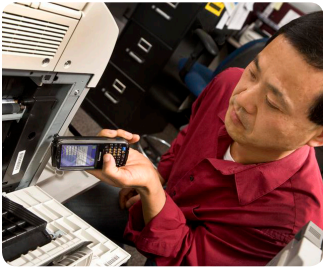
Note: Service operations that work primarily long-term prescheduled orders (i.e. one work order per day) are not good candidates for mobile computing automation.

By automating and implementing a Work-order Management System (WMS), Field Technicians can often times avoid reporting into the office each morning and go straight to their first job directly from home. This is a major cost savings for service companies since it often results in the ability for a tech to work an additional service order for the day. However, it can involve other considerations, such as Techs taking service the vehicle and mobile computer home, leaving no chance for vehicle service, computer battery charging, etc.

When Field Technicians miss work (e.g. call in sick etc.) it creates a major disruption for the dispatcher or router. If a temporary worker cannot fill in, then work orders must be scheduled into other Technician workloads. Likewise, disruptions during the day (i.e. a truck breaking down or a service call runs over the estimated time) will cause dispatchers to move work around to other Field Technicians. These changes cause scheduling conflicts, missed appointments, and inefficient routing that can result in overtime pay and decreased customer satisfaction. They also add work to the back office, such as contacting customers to reschedule appointments.

Service agreements and warranties often specify SLA (Service Level Agreement) terms whereby the service provider is required to respond to the service call within a certain set of parameters (i.e. same day or within 24 hours). There can be significant financial penalties for failure to meet the terms of the SLA. Progress is tracked by the Dispatcher and Supervisor throughout the day. Staying in touch with the crew is an important Supervisor responsibility. Supervisors may make onsite visits to follow up on Technician progress or help train new employees.

Best-in-class service organizations will dispatch work in real time as much as possible. By waiting until shortly before a work order is scheduled to make the assignment, the Dispatcher has the greatest flexibility in determining who to send onsite. In order for this process to meet expectations, the system must have superior wireless communications.



Working the Service Call

Getting to the service location quickly is a major cost benefit for automation. Navigating to a service site can also be frustrating for technicians. GPS (Global Positioning System) and AVL (Automatic Vehicle Location) to aid navigation are required components for many automation solutions. Mapping systems used by Routers and Dispatchers to ensure efficient traveling from work site to work site by Field Technicians is a requirement for many back office systems. Best in class routing solutions will route a Field Technician away from their start location and back to their ending location at the completion of their shift.

Selling Key: In many cases, competitive GPS products require yet another device to charge and manage. The address must be keyed while on the phone with the dispatcher, wasting valuable time. Intermec Mobile Computers can solve this.

Note: Productivity improvements are typically the #1 cost justification element for automating a mobile service environment. A 30% increase in productivity is the average (i.e. a company with Techs working an average of 3 service calls per day will justify the system by stepping up to 4 calls per day per Tech).

Once Field Technicians are on the road they are expected to report their status throughout the day. In a manual environment, Technicians report by calling the dispatcher via cell phone or two-way radio. Information for urgent service calls must be read off to the Technician over the phone or over a radio while the Tech writes the information down. This is both highly inefficient and error prone; the productivity improvements here becomes one of the biggest areas of ROI when adopting mobile computing and automation.

Wireless communications is a requirement for automating a field service environment. Prior to WWAN (Wireless Wide Area Networks) or Cellular Data Networks, sending data wirelessly was expensive and time consuming. Most companies set up mobile applications to send critical data during the day, and reserved larger uploads for wired connections back in the office. Some companies still operate this way, but cost justifiable wireless solutions make this less of a requirement. An automated system will collect status information (i.e. en route, onsite, on break) as the Field Technician moves from one job to the next throughout the day.

Superior wireless communication is critical when operating indoors. Often times a Field Technician must work in a basement or near equipment that will shield the device from reaching the tower.

When they begin travel to their next job, Techs press the “en route” key to send a wireless status update to Dispatch. On arrival at the service location, the Tech presses the “onsite” key to update Dispatch. With systems using AVL, it is usually not necessary for the Tech to send status messages since the dispatcher can see on a map where the truck is and if it is moving. Even with this however, Tech’s must act to acknowledge receipt of new service calls to ensure the dispatcher knows they have been received.

On arrival, Techs first find their contact (generally the person who called for service, but could be someone else, such as an onsite maintenance person). Based on the reported symptoms and an inspection of the equipment, the Field Technician will determine the best course of action to fix the problem. The Tech may refer to historical information in order to help determine the source of the problem. In a manual environment, this means referring to paperwork and/or calling the support center to have someone look up previous problems with the equipment. Having electronic records accessible on a mobile computer eliminates this and is another major benefit to automation.

Field Technicians may also refer to manuals before and during the repair process to help them determine how to proceed. Carrying manuals can be very cumbersome, so they are often left in the vehicle and referred to as a last resort. When a Tech must return to a vehicle – for any reason – it becomes very time consuming and affects their productivity.

Field Technicians consider the hand held computer another work tool. They’re on the go operating in harsh conditions where tools get dropped, knocked around, stepped on, spilled on, exposed to dirty and dusty environments. Field Technicians are typically a service company’s most costly resource so you do not want them taking time out of their day to deal with computing issues. You do not want the Tech to be required to treat the mobile computer with kid gloves. You cannot afford to have them operating in the dark when a unit does not work. Once you commit to automating your field technicians with mobile computers there is no falling back to a paper based dispatching environment.



Note: A trend in mobile computing is automation of the knowledge management process. This includes providing electronic and/or online access to manuals, technical bulletins, and “specialists” during the repair process. This can drive mobile computing requirements for a large display to view schematics, large hard drive to store images, and integrated audio/video to communicate to repair specialists.

Before starting a repair, the Technician may be responsible for discussing costs with the contact, especially if the equipment is not covered by warranty or a service contract. On occasion, the Tech will contact the dispatcher or supervisor about the billing, and may even ask the contact to get on the phone to talk to customer service before starting work.

Field Techs must carry tools to the job site, housed either in a toolbox or on a tool belt. Sometimes specialized tools such as compressors or welders must be wheeled in. Gaining access to the equipment to be serviced can prove difficult (i.e. an air conditioning unit on the roof, a part in the belly of a plane, or a furnace in a boiler room). For residential calls, a technician might put on shoe protectors or take other precautions to improve customer satisfaction. Not burdening the Tech with a heavy laptop is a key benefit for handheld computers.

For some repairs, an interface from the mobile computer to the service equipment is required. As an example, modern elevators may be programmed by making a serial connection to a port located on the elevator car. It is critical that the mobile computer is capable of providing this function so the Tech is not required to pack another device. Likewise, an interface to the equipment may be required to run a diagnostics check before, during and after a repair, to ensure the equipment is back to working order. Telco’s have gone to great lengths attempting to integrate test equipment with mobile computers to eliminate the need for the Tech to carry multiple pieces of equipment.

Wireless communication issues can arise when a Field Technician enters some buildings or areas. Service work is often performed in places like basements or computer centers where wireless communications are poor; superior wireless performance is a key advantage in these situations.

Managing Parts

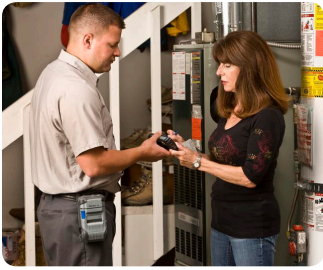
Tracking parts used to complete a work order is a major problem for service organizations. The company relies on technicians to accurately denote the parts used on a service call for inventory tracking and customer invoicing. Poorly tracked parts cut into profit margins and impact productivity. It is not uncommon for techs to have a side business run on company-supplied parts.

Multiple trips back to the customer site to fix the same problem can be a huge cost for a Field Service organization, and not having the right part to fix the problem is the most common cause. This problem forces many companies to stock Field Technician trucks/vans with an abundance of inventory – which is very costly as well. Companies struggle to find the most cost effective mix of on-board vehicle inventory, warehouse inventory, and ordered/shipped parts. An automated system can help with this issue by giving the Technician visibility into parts inventories on their trucks, in other technician vehicles, and in the warehouse. Techs can also place orders for parts during the service call directly from the mobile computer.

Most Technicians will carry a set of basic components to fix most repairs, and pick up specific parts they need (or think they need) prior to the appointment. The call center dialogue with the customer during the initial call is critical to accurate parts selection for a repair. On occasion, an initial trip must be made to the customer’s premise to identify the required parts before they can be ordered. These inefficiencies in parts handling are costly, so companies try to avoid them as much as possible. Best-in-class operations will call for clearly required parts, plus some “just-in-case” parts to ensure the repair can be completed during the initial visit.

Technicians are responsible for tracking parts used on the job. In a manual environment, this means writing down each component as it is used or after the repair is done. Looking up part numbers and costs requires carrying an updated list. Some companies have been able to justify ROI for automation simply from wireless parts and price list visibility.

Note: A significant increase in productivity is achieved when barcode scanning is used to manage parts on the job.



All unused parts must be returned to inventory, but parts seepage occurs when Techs keep unused components for use on other jobs or giving parts away at no charge (i.e. an extra coax cable from the cable installer). This means that tracking parts is a key consideration for automation.

Getting parts into the hands of Technicians is a logistical challenge. Technicians must periodically stop at the warehouse to replenish basic stock items, and pick up any ordered parts. To reduce the time required for parts replenishment, best-in-class companies will send parts directly to the customer's premise or the technician's home in advance. For some specialized equipment (i.e. high-end medical or airlines) parts and technicians may both be flown in for the repair.

Automated environments will track parts usage and automatically order replenishment parts. Automated systems will also keep a running inventory of each Technician's "truck stock" so they can refer to it before making a trip out to the van. Best in class systems will also show truck inventory of nearby technicians where the part can be found for quick retrieval, and may list stores in surrounding locations that carry the part.

Completing the Job

If the repair is taking longer than estimated, it is the responsibility of the Field Technician to notify the Dispatcher. In an automated environment, the Dispatchers will be alerted at their console when a Technician is approaching the estimated time to complete the service call. In this case, the Technician is contacted for an update and new estimated completion time.

It may be necessary for the Dispatcher or call center to contact customers with future commit times to negotiate new appointments if the Tech cannot catch up or another technician cannot take some of the calls. Missed appointments and repeats are important tracking metrics and not well tolerated in companies striving for quality customer service.

Near the conclusion of a service call, the Technician will run a final test on the repaired equipment. In some cases, test results are tracked and stored on the mobile computer for future retrieval by customer service staff (i.e. HVAC companies, security companies, etc.). In a manual environment, this means writing down the test results for someone to key into the system later. With automation, the results can be stored and uploaded real time or upon return to the office or home.

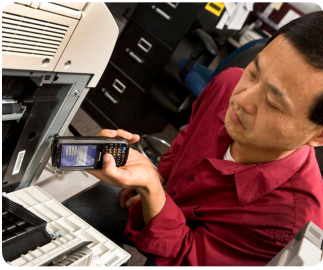
Following final testing, the Field Technician will close the service order and complete the service call by logging what was done to fix the problem. If the repair is incomplete, a new service order may be opened for a return trip, or the existing service order will be left opened and reassigned for a later date.

Parts and labor must be tracked for invoicing purposes, particularly when the customer is not under a maintenance contract. An automated system will often be able to track labor time through having the Tech presses a "start job" and "end job" key. When barcodes are used for parts tracking, the parts can be scanned for invoicing.

Before leaving the job site, the Technician will usually have a discussion with the customer about the disposition of the repair. Techs will tell the customer what they found and what they did to fix the problem. They may go over a list of parts and the amount of time it took to complete service. If a return trip is required, the Tech may set up the appointment at this time. Techs must often get signatures to confirm customer acceptance of any charges. Having the ability to swipe a credit card and print a receipt saves a great deal of time and is an added convenience for the customer. Immediate transmittal of job completion information is critical to starting a fast billing cycle. This can significantly improve cash flow and collections for a service organization. It is a big benefit to have a signature on file when service or billing disputes arise.

Note: Electronic parts tracking and signature capture reduce paperwork and eliminate the possibility of lost invoices. Swiping credit cards and printing receipts onsite also significantly shortens the service-to-bill cycle. Many companies have justified automation by shortening the billing cycle alone.

A billing may also include a travel fee or up-charge for special services (i.e. service on a holiday or weekend). Vehicle mileage is computed from start of day and end of day odometer readings. Mobile computers are usually left in cradles overnight at the service depot to ensure proper charging and



enabling downloading of routes prior to the next day. Techs reporting from home offices must recharge their equipment and may be required to have a network with access to the back office system.

When finished at the job site, the Field Tech returns to the vehicle and sends a status message, notifying the Dispatcher that the service call is complete. This information is passed back to the call center in case of customer inquiries. The Tech loads up the truck and travels on to the next service location.

Ending the Day

At the end of the day, Field Technicians will return to the service depot or directly home, depending on the company requirements. In a manual environment, Techs must to drop off their work for the day and complete their time/expense reporting. Information collected during the day must be keyed into the system by a clerk. Poor handwriting, incomplete material, wet paper, etc., forces the clerk to follow up with the Technician. In the best case, this occurs before the Tech leaves the office, but that is often not a realistic goal.

In an automated environment, the Field Technician is not necessarily required to return to the service depot at the end of the day. Timesheets are calculated electronically, and service call information is sent directly into the system. This eliminates not only the data entry (and the clerks), but any inaccuracies that may be inserted "in translation."

Note: A big bonus in electronic data exchange is that by not reporting into the office, Technicians are able to get to their first job sooner in the morning and stay on the job longer in the afternoon... without accruing overtime.

Why Intermec? – The Intermec Field Service Elevator Story

Situation: Like many businesses, Field Service organizations face economic uncertainty and increasing competition. Their continued profitability – and customer satisfaction – depends on their ability to operate with increasing efficiency across both their field and back-office staff.

Conflict: Unfortunately, superior customer satisfaction and operating efficiency both rely on one of the most expensive elements of every Field Service operation: a strong, agile, well-trained, motivated labor force.

Resolution: As the only vendor providing every key building block for a rugged mobile business solution, Intermec has solved this difficult equation. Our purpose-built products can be managed and supported by our unified software and services platform, and are backed by our one-stop support infrastructure through our global reseller network.

Benefit: By focusing our design on the user first, each Intermec solution element adds to optimized worker performance. By offering all the key components, we are able to ensure the lowest TCO from one generation to the next. Intermec has redefined the rules for TCO, and just as importantly, for TCE; the Total Customer Experience.

Buyer Profiles

Economic Buyer (CFO, VP Finance, Controller, or represented by the CIO, VP IT, etc.)

TCO and ROI are primary considerations for this buyer. The Economic Buyer will compare pricing with the competition, will want to understand the long-term warranty and maintenance costs. They may require NPV (Net Present Value) calculations in addition to ROI and TCO analysis.

The Economic Buyer needs to be convinced that an investment in technology, while more costly upfront, will result in long-term savings. In some cases, service organizations run off their own P&L so revenue generation can also come into play. For product manufacturers delivering warranty service, and for "self-service" organizations (such as the banking operation that maintains its own cash machines), the Service organization is a cost center. They will have no related new revenue opportunities and will be concerned almost exclusively with reducing expenses.



Facing the high cost of paying for field personnel, productivity is a key concern. How can the solution speed work and eliminate overtime without losing service quality? More experienced workers are more effective, but command higher salaries. This buyer will want to see how less experienced workers can be made effective through the use of automation tools with knowledge management and “on demand learning.”

The Economic Buyer wants to contain costs for fleet management, so integrated or vehicle based GPS/AVL to shorten drive times will play well here. Reducing headcount in the back office (dispatching, routing and supervisory personnel) can be accomplished by centralizing field offices greatly enabled with an automated field service solution.

Reducing inventory is also a major concern of the Economic Buyer, so focus on the efficiencies gained with an automated parts management solution and how it all begins by accurately tracking usage with barcode scanning. Accurate parts tracking is also used for billing purposes so there should be an increase in revenue as well.

Onsite receipt printing and signature capture enable a shorter service-to-bill cycle. Magnetic swipe for credit card scanning is a best practice used in this process as well. Each of these components is required for an effective solution. This will play well with the Economic Buyer

The Economic Buyer is interested in the process used to track and measure benefits of an automated field service solution. This becomes significantly easier with a mobile computing solution. Status messages sent from the mobile computing device enable the independent tracking of travel time, job time, and downtime. The number of jobs completed per day, missed appointments, return trips and overtime are all tracked and reported on as part of the system.

For organizations that sell maintenance agreements the service business can be highly profitable, often carrying higher margins than the original product purchase. A mobile computing solution will help enable Field Technicians to sell new or extended service agreements. This valuable customer touch-point is a great way to capture new revenue.

Creative financing may arise in discussions with the Economic Buyer. Equipment leasing and payment terms may be of interest. Software as a Service (e.g. Salesforce.com) may be attractive, especially for companies that are short on capital. Cloud computing, where IT equipment is housed by the software company or an independent 3rd party, may reduce IT costs.

The Economic Buyer recognizes that customer satisfaction drives repeat business. Automation will help field service companies respond efficiently to urgent requests, hence improving their ability to meet SLAs and commit times. Measuring customer service is difficult but greatly improved with a mobile computing solution. Having the ability to conduct an onsite survey with the customer at the completion of the call can be done using the mobile device.

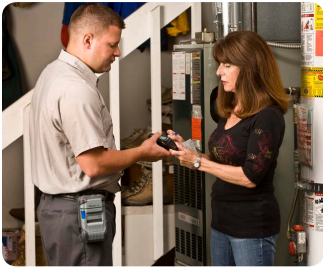
Technical Buyer - (CIO, VP IT)

Technical Buyers are concerned about supporting the system. They will examine how well the technology performs and how well it ties into existing systems, and will want to be sure there is a clear path for installing and supporting the solution.

When their own IT organization is not capable of developing and supporting the field service system, Tech buyers need find a partner they can rely on. They typically start with their existing CRM provider and the ISV's compatible with their existing CRM solution. They do not want to build out these point solutions since it requires additional one-off support; however, they often find that no one provider can fulfill all their requirements.

In conjunction with the mobility solution decision, the Technology Buyer will be concerned about the mobile computing hardware. Sometimes they will seek advice from the application provider, so maintaining good relations with that vendor is important. They will want to:

- know that the platform is capable of processing the application without disruptions
- ensure that the device is capable of storing all the necessary information required by field users



- certify that the unit can communicate wirelessly as required in the field and back office
- ensure interfaces to any peripheral components today and as future requirements dictate
- know the roadmap of product platforms to ensure they grow as their requirements expand

They will compare hardware specifications with competitive offerings to make sure they are getting a good price on the equipment necessary to meet their requirements.

The Technical Buyer is responsible for supporting any new users on IT systems and networks. Accordingly, Field Technicians pose a unique challenge. Techs are not typically computer literate, and they are not “connected” within the four walls so they must deal with wireless communication issues as they cover their service territory. This means that Technical Buyers will raise concerns about network access and security, especially in cases where Techs transmit highly sensitive information such as credit card numbers.

Having a stable mobile computing solution is one of the Technical Buyer’s biggest concerns. The IT help desk will be required to support the Techs, and they want to keep the calls and complaints to a minimum. They will raise question about ease of use, and the rugged message will also resonate well with them; they know that high failure means more calls to the help desk.

Technical Buyers like to stay on the leading edge of technology but not the bleeding edge. They will ask about other companies using the proposed solution and how long their systems have been in place. They will focus in on the roadmap to ensure that they are not in the Beta stage of implementing a new solution. They like to be respected amongst their peers as a pacesetter but not to the extent that it causes support headaches.

Early adopting accounts tend to deploy smart phones first as the primary initial apps are schedule/dispatch.

Communication costs are typically a part of the IT budget. Accordingly, the Technical Buyer will take a close look at the wireless solution to ensure costs are reasonable. With today’s “all you can eat” data packages, this becomes less of a concern. In many cases, they will elect to deploy a solution with a primary carrier (i.e. AT&T, Verizon or Sprint) and then contract with secondary carriers in certain areas to get better coverage.

User Buyer - (COO, VP Service, VP/Director of Field Services)

User Buyers in Field Service operations are primarily driven by End User and Customer satisfaction. User Buyers drive to optimize workforce productivity, respond quickly to customer needs, and motivate their workers. Giving their workforce the right “tools” to do their job is their goal. The User Buyer often turns to the Technical Buyer for help in a crisis, especially when service business is increasing and hiring more technicians is not an option.

In many cases, User Buyers will have worked their way up from a Field Tech role. They will view solutions from the Field Tech’s perspective, and feedback from the Tech’s is important to them. They will want the Techs to see a demonstration of the technology and may request a pilot of the total solution proving out the benefits before accepting it. The User Buyer wants to ensure that the system will have a positive impact on productivity and will ultimately create improved customer satisfaction.

User Buyers want their Techs to be focused on completing the work and not distracted by issues with technology. Ease of use, simple interfaces, and high quality products will go a long way with this Buyer. Any “paperwork” is also seen as a necessary evil, and they are all for anything that reduces it or makes it easier. They also recognize that Techs do not necessarily have the best customer service skills, so minimizing customer interaction may be a goal. They may see the mobile computer as a tool to help accomplish this.

Note: When customers see a Technician with a computing device they tend to think more highly of the Tech and the work they are doing, so this can help drive adoption.

User Buyers are often measured on customer satisfaction, so in turn they measure their workforce using customer satisfaction metrics. They track repeat rates, number of jobs completed each day, drive time, overtime and average repair time for each Technician. They monitor customer satisfaction surveys, and are often pulled in to resolve customer disputes. Because Techs are both remote



and mobile, they are tough to track. The User Buyer wants a system that can help them monitor performance metrics and give them insight into Technician activities. Systems like GPS and AVL are a big hit with User Buyers.

When it comes to completing the work, the User Buyer wants the Tech to be in and out of the job site with minimal interruptions. They want conversations with the Dispatcher kept to a minimum. They want the techs to show up with the right parts and get the repair made the first time. If the Tech needs to refer to a schematic, they want it to be easily accessible. They are often against systems that enable techs to talk to one another, and against computers that can be used for something other than work. They want automated time tracking and expense reporting.

User Buyers are faced with an aging workforce. The better Techs are often the older Techs. They have tribal knowledge and know the shortcuts. Older Techs are also the most difficult to enable with new technology. Their learning curve is greater, they have difficulty reading small displays, and they may be set in their ways. They have been doing things one way for years and may not see the need to change. User Buyers are sensitive to this so they focus on things like ease of use and adaptability.

Training new Technicians is also a concern of the User Buyer. It can take weeks, months, or even years for a new Tech to reach optimum productivity. Training aids and knowledge management solutions will shorten the learning curve for new techs in this buyer's organization. New technologies for on-demand learning (i.e. video aids, electronic training material, and access to product specialists) are of interest to User Buyers.

Holding on to customers is another key concern of the User Buyer. When the service organization cannot respond quickly enough to a customer's service needs, they run the risk of losing the customer to the competition. Having enough Techs on staff to respond to the work must be balanced with cost control. An automated field service solution allows the User Buyer to monitor work and adjust staffing requirements accordingly. When a Tech suffers a problem with a mobile computer, it can completely disrupt service delivery. Playing up rugged features, long battery life, solid wireless communications and general uptime resonate well with this Buyer. They cannot afford to have Techs on a route with a failed mobile computer.

Ergonomics are important to User Buyers. They will be interested in solutions for carrying the equipment, vehicle mounting options, peripheral handling, etc. Safety issues are also a concern; they want to make sure that units will not come free from the cradle if an accident occurs. They are concerned about Techs using the device while driving.

Target Segments

The targeted segments section of this document describes the industries, verticals, and sample organizations found in targeted segments. This is not an all-encompassing set of verticals, but rather a short list of those segments that are considered high priority. Prospects in other segments and verticals may be candidates for field service industry solution sets and should be addressed opportunistically.

High Tech Manufacturers

High Tech Manufactures are organizations involved in servicing equipment with microprocessors.

Target Industries within this segment include:

- computer and peripheral equipment companies (IBM, HP)
- HVAC and refrigeration service (Carrier, Trane)
- industrial machine manufacturers (Thyssen Krupp, Schindler, Kone)
- appliance manufacturers (Whirlpool/Maytag)
- electronic equipment manufacturers (Canon, Kodak)
- surgical and medical equipment manufacturers (Abbott Labs, GE Healthcare)
- electronic banking equipment (Diebold, Bank of America) among others

The High Tech Manufacturing industry is both the largest AND one of the fastest growing field service segments. Many of these companies are advanced in deploying work order management solutions, and may be on second or third generations of mobile computing equipment. Rugged features are



not as critical but do come into play. They rely on wireless communications and parts scanning. In some cases, they have a requirement to use the device to interface with the service equipment for programming or diagnostics purposes.

Note: Larger form-factor mobile computers are desired when schematics are a requirement so avoid these engagements.

Retail

Retail service organizations service products sold through retailers. Industries in this segment include:

- retail stores (Sears, Wal-Mart)
- automotive (AutoZone, Pep Boys)
- home centers (Lowe's, Home Depot)
- TV and electronics (Best Buy, Sony)
- Internet stores (Amazon, E-Bay)

Many of these retailers do not have their own Field Service organizations, and rely on 3rd parties or small local companies to handle field repairs.

Companies in this segment are all over the map when it comes to automation. In some cases, like Sears, they are advanced in automating their mobile workforce. In other cases, especially small local businesses, they manage their work strictly on paper. Some products in the electronics space are being manufactured with built-in diagnostics, so there may be some interface requirements for the service equipment. Magnetic swipe for credit cards and mobile receipt printing may be a requirement with some of these organizations. GPS on the vehicle or in the mobile computer is important for navigation and AVL. Parts scanning plays an important role. Wireless communication from the home is a requirement so superior performance in this area is critical. In-vehicle mounting and charging is usually a necessity. Recent trends call for imaging to ensure installation work is completed correctly and/or the ability to view videos for training purposes. Having the ability to view schematics to look up parts is often a requirement that drives these businesses to larger form-factor products. Rugged features are highly desired.

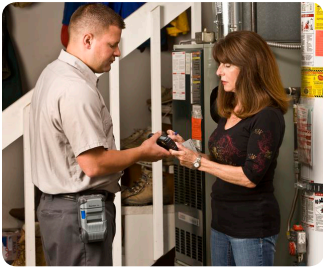
Residential/Commercial

Residential/Commercial service companies provide services for the home or commercial workspaces. Industries within this segment include:

- building services (EMCOR, SimplexGrinnell)
- plumbing and HVAC services (Roto Rooter)
- security systems (ADT, Brinks)
- extermination (Rentokil, Terminix, Orkin, ServiceMaster)
- janitorial services (ABM Industries)
- landscaping and lawn care service (TruGreen, Scotts)
- carpet and upholstery (ABM Industries) and automotive repair (Safelite).

There is a great deal of opportunity for automation in this segment since much of the scheduling is on-demand.

Companies in the Residential/Commercial segment require rugged mobile computers with wireless communication for their workers. Their processing requirements tend to be low end, as dispatching and work order management are the primary applications. Navigation is often a requirement. Mag swipe for credit cards and mobile receipt printing may be a requirement with some of these organizations. GPS on the vehicle or in the mobile computer is important for navigation and AVL. Parts management is not as critical for most companies operating in this space. Vehicle mounting and charging are a high priority.



Cable/Telco

Cable and Telco companies are responsible for installing and servicing telecommunications equipment for homes and businesses. Industries within this segment include:

- cable companies (Comcast, Time Warner)
- wireless companies (AT&T, Verizon, Sprint)
- satellite service providers (Dish, DirecTV)
- telecommunications companies (AT&T, Verizon, CenturyLink).

Due to deregulation in this industry, a number of smaller players known as CLEC's (Competitive Local Exchange Carriers) have appeared to provide service to small communities. The popularity of cellular communications, satellite TV, and internet services have caused this industry to experience explosive growth over the past few years.

Many of the large field service organizations in this industry are very mature in mobile workforce automation. Mapping (cable locates) and testing (internet service providers) make large form-factor rugged devices popular in this segment. Due to the frequency of Techs running a side business from their homes, managing parts is a key concern.

In some cases, companies have tried to integrate mobile computing and test equipment to reduce the pieces of equipment the Tech must carry around. Independent mobile computers must interface with the test equipment, so wired and wireless connections must be available.

Wireless communication and GPS for navigation and AVL are important components for these workers. In-vehicle mounting and charging are also a typical requirement. Vehicle based printing was important at one time but that requirements is seldom seen today. External scanners for parts are a possible play.

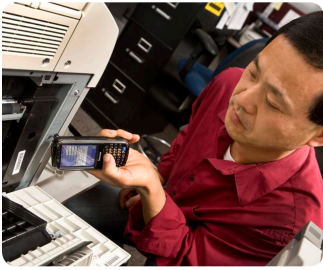
Primary Applications

Back Office Applications

The service call process begins when the customer contacts the help desk for service. The help desk will log the call, confirm account information, check history, and set up the customer for service. For large organizations, applications that support these services are typically derived from Customer Relationship Management (CRM) systems developed by Systems Integrators (SI's) for managing call center activities. Point solutions are available from a variety of vendors for smaller companies wanting to automate their call taking processes.

In order to set appointments for customers, call centers required a data exchange from the field letting them know the status of technicians, availability, skill set, and location. In a manual environment, the call center must track this information on paper or in a spreadsheet. With an automated environment, this information is updated real time and made available to the call taker while the customer is on the phone ensuring a much more accurate commitment. The net benefits from automating this segment of the business result in improved response times, adherence to SLA's, and improved customer satisfaction.

On the back end of the service call process, office administrators will monitor incoming information from completed service calls to facilitate invoicing activities. A great number of issues arise when this information is kept on paper. Clerks must wait for paperwork to be turned in at the end of the day, they have difficulty reading handwriting, there can be transposition errors, and information can be incomplete requiring follow up with the Tech the next day. These issues create billing delays. By implementing a mobile computing solution, data is input by the Tech at the completion of the service call eliminating the need for later input by a clerk. Data errors are reduced with validation routines and Techs are prompted if information is incomplete. Streamlining these processes result in fewer back office resources, more accurate data and shorter service-to-bill cycles.



Dispatching and Scheduling

Dispatching decisions are based on technician skill levels (do they have the knowledge to work on a job), availability (is there an opening in their schedule), location (is it convenient for the tech to make the stop), and parts (does the tech have the necessary part(s) to fix the problem). Complex dispatching systems will use these criteria, and more (i.e. traffic patterns), to make automated dispatching assignments. In order for these systems to work, they need updates from technicians on their daily progress. Typical job status messages include 'enroute', 'onsite' and 'complete'. Field Technicians will also status the Dispatcher when they go on and off a break.

Automating the management of work orders is typically the first major field service app to be deployed because the productivity improvements for both the dispatchers and the field service workers are significant. Most companies Work order management systems are packaged applications from independent software vendors (ISV's). Dispatch/Scheduling systems are used to manage work orders. If the work order management system is not part of the CRM system, then work order information collected during the call taking process is passed from the call taking system to the dispatch system. Their goal is to create real-time visibility and coordination of field technicians.

The primary challenges are resource planning and the ability to address real-time exceptions for scheduling and managing appointments related to SLA performance requirements. The primary benefits are enhanced worker productivity and adherence to SLA's. This can be measured in number of completed calls per day, on time SLA performance, and other metrics that may be specific to the customer's particular environment. Additionally, many of these applications aid in communications between the dispatcher and the field worker using Wireless Wide Area Network (WWAN) communications to send service order details to the field. Field workers benefit from improved data presentation and data capture to and from the mobile device ultimately reducing manual processes.

Field Management Applications

Field Service Supervisors, managers and dispatchers constantly monitor the technician workforce progress. Their primary problems center around issues in communicating with field workers. Communication problems include technicians who are away from their phone or computer, techs who are busy and unable to answer, out of coverage conditions and dead phones/computers. Not being able to contact field workers results in major problems for dispatchers who are trying to get the work out and respond to customer needs.

Dispatch and scheduling applications typically have integrated components to view work order assignments by groups of techs or individual assignments. Tracking throughout the day is handled by periodic status messages from field technicians letting the office know when they are enroute, onsite, or have completed a service order. Tracking workers and work is made easier with an automated Field Service Management system. Applications using Automated Vehicle Location (AVL) systems will graphically depict technician locations on a map from GPS coordinates for simplicity in dispatching new work assignments. Benefits from automating these processes include improved productivity and better response times.

Labor Performance Monitoring

With the increasing costs of fuel, wages, insurance and other liability concerns, companies can benefit by actively monitoring their mobile workers' job site efficiency and effectiveness. By creating standards for typical jobs and having visibility of individuals start/stop times, companies can enhance their management of labor, identify poor performance, have a real-time view of all pending jobs, and estimate the best/next available personnel to respond to ad-hoc service requests.

Mobile Applications

Work order management is a likely next step in automation once a dispatching and scheduling solution is in place. Many dispatching and scheduling applications contain a mobility component to enable data exchange with mobile computers. Field workers receive new work assignments wirelessly to the mobile device. They can accept or reject work from the device. As they complete work assignments throughout the day a log is kept to enable automatic creation of timesheets. Major benefits in productivity are derived by automating this process and eliminating the need for the technician to call into the office for new work assignments.



Navigation and Route Optimization

This may be part of the scheduling and dispatch application and/or a stand-alone application product. The combination of automated scheduling and dispatch functionality with location awareness (GPS) and voice/data communications can add significant efficiencies and help to contain costs. For example, automatically routing the nearest available technician to a critical SLA repair customer or managing real-time routing exceptions by least cost for fuel and overtime decision rules can have a major impact on cost management.

Customer Site Applications

Very often documenting the service provided is just as important as the actual service. Having the ability to document and communicate service performance in real-time electronically may in many cases be more immediately visible than the service work provided. This can be leveraged in many cases to create a positive, professional image and generate a higher degree of customer satisfaction with the entire service experience. Applications that automate proof-of-service and may include payment capability and/or automated invoice generation also dramatically improve service-to-cash cycles and reduce manual paperwork errors and delays. For commercial customers, the ability to generate performance metrics reporting based on data captured electronically at the time of service can serve to eliminate disputes on SLA performance and increase overall customer satisfaction and retention rates. Some mobile workers carry notebooks when they really do not require them. Rugged notebooks are heavy and are often left in the car. Techs lose productivity when they must return to the vehicle to look up parts or send a message.

Knowledge Management Applications

Automating knowledge management is becoming popular with field service organizations. Likewise, shortening the process of transferring knowledge from aging workers to younger technicians is a major benefit. Knowledge management tools include the use of schematics and video to train techs on common service processes, storing service history events for future use, online access to service bulletins, and taking pictures of completed installations. Trends in the industry include opening up text messaging between techs and setting up access from the field to specialists at the back office to walk mobile workers through advanced repairs. The overall benefits include shorter repair times, reduced repeats, lower repair costs and improved customer satisfaction.

Warehouse Applications

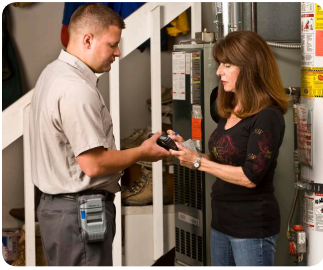
Parts inventory tracking is typically one of the last applications to be addressed. However, depending on the value and types of parts being carried by field personnel, there can be substantial savings related to actively managing inventories. Many manual processes in place today simply use a passive check out/check in process to increment/decrement inventory levels. This simplistic process does not allow management to capture or address issues of warranty, shrink, or other desirable visibility issues.

Additionally, depending on the operation, if there are specific SLA requirements that are negatively impacted by on-vehicle stock out situations, the service provider may be in violation of the SLA and incur penalties or worse, lose the customer. Track and trace applications, particularly those using bar codes, are important opportunities that warrant consideration when looking at the target mobile computer purchase planning.

Channel and Partnering

ISV's - Independent Software Vendors

An Independent Software Vendor (ISV) makes and sells software products that run on one or more computer hardware or operating system platforms. They develop software solutions for a variety of field service applications including work order management systems, parts logistics systems, time and expense reporting, asset management, knowledge management, and tracking and navigation systems. Software applications can greatly enhance business logic, such as selecting the right technician to dispatch on a service call or alerting the business to certain SLA requirements (i.e. response commit times). Best-in-class applications are configurable as the business needs grow to allow simple enhancements instead of costly programming. Software delivered by an ISV may be end-to-end or as a single component in a specialized area (i.e. mapping for AVL).



ISV's are generally hardware agnostic and not interested in reselling hardware. They tend to lead sales cycle since they are selling business process change and ROI, so developing and maintaining relationships with an ISV for early engagement into a prospect is a key business practice. In the absence of a hardware vendor, they are likely to lead with a consumer device.

MEAPs – Mobile Enterprise Application Platform Vendors

Mobile Enterprise Application Platform (MEAP) vendors provide software for mobile application development and deployment on mobile computing devices such as smart phones, ruggedized handhelds, and notebooks and tablet PCs. Best-in-class products will operate on a variety of mobile operating systems such as Symbian, Blackberry, Android, iOS (Apple), and Windows Mobile.

MEAP vendors tend to be hardware agnostic and will recommend products that best support their development environment. They utilize a developer channels to go to market, particularly outside of Tier 1 accounts. Channels include hardware VARs doing software services (ex: MobileFrame has 9 Intermec hardware resellers in its channel). These VARs are generally focused on the Tier 3/Tier 4 (SMB) markets.

MEAP vendors will work directly with large end user accounts utilizing internal development resources or working through their systems integrator (SI). If selected by a large customer, the customer will identify their need, create the spec and lead the ROI development. Selection of a MEAP occurs when the customer determines they require a “non-standard” solution but want to reduce internal development and support costs by building on a standard platform.

Custom Application Developers

Custom application developers are engaged when a company's needs cannot be fulfilled by an off-the-shelf solution. These applications are built to spec as defined and controlled by the customer. These engagements are opportunistic and not typically pursued as a core offering. Best-in-class organizations utilize configurable products with business rules to minimize development efforts. Custom development carries a high cost and restricts the organization from taking advantage of product enhancements provided under general version releases. In many cases, a customer will utilize a large percentage of the base application and customize a small portion of the system, but this too requires careful management of new standard releases. A customer's IT organization must be at the center of these engagements and often takes over the development effort. Custom development vendors utilize both direct sales and relationships with other vendors for lead generation/sales support (ex: wireless carrier, hardware vendor). They are generally not large enough to support a distribution channel of their own.

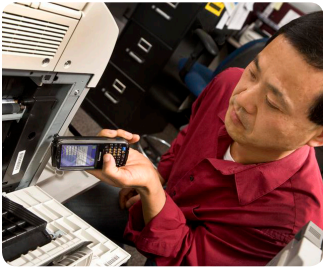
ERP – Enterprise Resource Planning

An Enterprise Resource Planning (ERP) system is an integrated computer-based application used to manage internal and external resources, including assets, financial resources, materials, and human resources. The purpose is to facilitate the flow of information between all business functions inside the boundaries of the organization and manage the connections to outside stakeholders. Built on a centralized database and normally utilizing a common computing platform, ERP systems consolidate all business operations into a uniform and enterprise-wide system environment.

In the field service environment, these providers include SAP, Oracle and Epicor. Each vendor has a “native” mobility solution to enable mobile application development on their framework. Best-of-breed solutions still dominate, but most ERP customers rank proven or certified integration very high. Per Gartner, SAP is more focused on field service. SAP has co-branded a number of solutions with field service market leaders (i.e. SAP recently purchased Sybase). ERP sales are through direct and indirect channels. They have a strong influence on companies that prefer to avoid bolt-on solutions due to high risk and cost.

Hardware VAR

A Value Added Reseller (VAR) focuses on hardware as their primary source of revenue but may provide software applications and/or services as part of the overall sale. Their revenue is derived from hardware sales, installation, training, kitting, configuration, activation, deployment, and hardware service/support. Software tends to be a distant focus as it can result in time-consuming support. Large VARs may have a software integration team that can assist with implementation of software, but often they are working collaboratively, utilizing resources from one of the software vendors above, particularly on Tier 1/Tier 2 accounts.



Many VARs can participate in this space. Intermec has 113 US VARs that identify field service as a target market; however, in reviewing most of their web sites, field service is not a core area of expertise. Discussions with Intermec channel managers may help identify a short list of key field service resellers.

Honorable Mention

There are vendors in the above categories that do not demonstrate a clear sales and marketing focus, or clear software product focus, on field service but do come into play on occasion. This includes ISVs and VARs that may have a stronger relationship with Intermec in other markets/applications (ex: WMS, T&L etc.) so the strength of the relationship may dictate placing them at a higher rank within field service for Intermec's purposes. For example, a company that is strong in Enterprise Asset Management (EAM)/ facilities maintenance is not considered core to the High Tech field service market, however, this vendor is large enough to be known in field service and may be used for large manufacturing facilities internal maintenance, and may cross over into mobile field service applications.

Trends/Compelling Events/Market Drivers

Trends

In today's economic downturn, more and more field service companies are looking for ways to improve productivity with their current workforce versus growing the organization. This is a key benefit for mobile computing solutions in this market. Companies moving from a paper-based work order management process to an automated environment can improve productivity by an average of 30%. Larger organizations have completed this step and are now looking for additional benefits from a second or third generation of technology.

Industry trends vary significantly by field service application and market segment. Since there is a broad array of market segments, the maturity of these markets dictate the associated trends. Take utilities for example. Since the 70's utility companies have been using handheld computing solutions to capture meter reads. This is a very mature market and application set that is well over the chasm, past the late majority and into the laggards. In fact, the trend has long been to move to automated meter reading where reads are collected remotely rather than by someone in the field. However, these same utility companies have smaller field service organizations, responsible for installations and meter services that are not nearly as mature as their own meter-reading counterparts when it comes to automation. They are, in many cases, deploying field service solutions for the first time and ripe for automation.

The current trend is for SMB's (Small/Medium Businesses) to automate their workforces. This has traditionally been cost prohibitive due to the expense associated with hardware, software and implementation services tied to solutions provided by SI's and ISV's. Cloud computing and SaaS models are opening the automation door for SMB's. A number of ISV's have started offering their applications via the cloud and have priced their services monthly. As an example, ServiceMax utilizes the Force.com framework – in much the same way that Salesforce.com is currently offered – to allow companies to manage their service work over the cloud and pay for services as monthly subscribers instead of licensed users. This significantly lowers the both initial investment and the IT maintenance costs, and paves the way for SMB automation.

Larger organizations with work order management solutions currently in place are looking at second and third generation applications to gain improvements in productivity. Utilizing the current work order management infrastructure, companies are finding productivity improvements by tracking workers with AVL applications, tracking parts, and allowing field users to access inventory or order parts while onsite, and improve knowledge management using sophisticated interactive applications that drive users to the root cause. These implementations offer not just gains in field productivity but also improve the efficiency of back office operations.



Compelling Events

As with trends, compelling events must be considered for each market segment. As discussed previously, the economy is a compelling event that has caused the entire Field Service DE to explore ways to get more out of their existing resources. This creates a strong case for investing in an automation solution versus the ever-increasing cost of managing the field service workforce. TCO models take this into account and should be leveraged during engagements where automation is being considered. Intermec solutions take this one step further by offering a rugged computing solution that adapts to a variety of field conditions for long-term savings.

In certain markets, regulations can play an important role for companies deciding whether or not to automate their mobile workers. For example, deregulation of the Telco market over the past twenty years has allowed CLEC's (Competitive Local Exchange Carriers) to enter the market and offer alternative services. The progressive nature of these companies tends to make them ideal candidates for automation. Conversely, companies like CenturyLink have been acquiring and merging Telcos, requiring their systems and processes to be integrated. This has led to additional automation opportunities.

In the case of public safety, COPS (Community Oriented Policing Services) is special funding geared to help local police agencies deal with the ever-increasing demands on their services. It includes investment in computing technology to help offset the resource requirements. These funds can be applied to workforce automation.

Market Drivers

Market drivers in Field Service center on technology enablers. Cost for communications bandwidth has decreased dramatically over just the past few years, opening up a wide array of new options for mobile workforce automation. Years ago, a field worker would have relied on using a pay phone, customer phone, or two-way radio mounted in the vehicle to communicate with dispatchers or other back office personnel. Today, cellular data communications has completely transformed this environment and cleared the path for a multitude of applications. It is now possible, for instance, to conduct a video conference with an equipment specialist when a problem is encountered in the field. An on-board camera can be used to capture images and even show real time work being done on an appliance for guidance in making the repair.

Another market driver is the wide availability of low cost computing solutions. Quite recently, the only viable solution for field service companies was a rugged mobile computer with a hardware cost alone exceeding \$5,000 per user. The cost of mobile computing hardware has decreased to the point where companies can now afford to make the investment. The consideration is now whether to invest in a very low cost solution (i.e. Smart phone) taking into account multiple replacements, or invest in a product designed to withstand the environment over the long term. The TCO model for a long-term investment is very compelling for most Field Service companies.

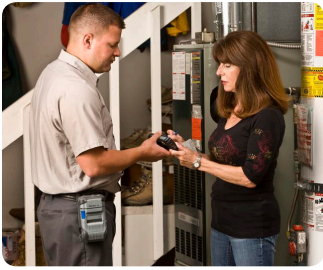
Sales Opportunity and Engagement Qualification

Engagements to Avoid

Certain requirements will dictate the need to steer away from an engagement regardless of size. In cases where a large display is required for detailed parts schematics or detailed mapping (i.e. Telco cable maps referenced before digging), handheld computing should not be pursued. When users require heavy keyboard input (i.e. insurance adjusters), a small handheld keyboards will not suffice. Some industries have special requirements (i.e. integrated Telco testers) that will drive requirements to a unique product solution set. These topics should be addressed prior to any engagement with these customers.

When to Capitalize

Ideal customers for Intermec's rugged mobile computing solutions in field service will be operating in harsh environments (outdoors, or indoors with the potential for drops), will require onsite receipt printing, and will make use of integrated bar code scanning of parts. They will currently carry a great number of tools and/or a large parts inventory, so they have little room to carry anything else. They will require superior wireless communications to operate from remote service locations, and the Techs will spend most of their day traveling throughout the service territory. They will have no problem with viewing information on a relatively small handheld display, and will need to type very little input. Battery life of over 8 hours will be a key concern. Overall, they are after a lightweight and manageable solution.



Appendix A: Why Adopt Mobile Computing in Field Service

Field Service organizations are compelled to automate their operations in order to increase productivity, improve customer service, and motivate their field service workforce. On average, a 60 minute per day per technician savings is achieved by companies moving from a manual, paper-based, work order management process to an automated solution. Time savings can be applied to work additional service orders, up-sell products and maintenance contracts, engage in preventative maintenance processes and/or reduce headcount. A solid business case is a prerequisite to undertaking most automation initiatives. The following are some key guidelines when developing an ROI model.

Gartner Document: Creating Persuasive Mobile Business Cases in a Recession

12 February 2009 | ID:G00165062

Well-chosen mobile worker applications can be a good business decision, even in a recession. However, the business case must be persuasive and aligned with the corporation's recessionary imperatives

Overview

Here we explore the tactics needed to create a persuasive business case for mobile worker applications in a recession. It is intended for CIOs, project managers and business-unit leaders wanting to justify mobile investments during difficult economic times.

Key Findings

Applications for mobile workers can deliver good return on investment, even in a recession. A business case for investing in a recession must be more sophisticated and more persuasive than in normal times. Fortunately, many mobile worker applications can support recessionary business goals.

Recommendations

Identify mobile worker applications that can support the goals of business in a recession and can be justified even in a constrained financial environment. Design applications and business cases to minimize the use of resources that are particularly scarce in a recession (such as staffing and capital) and to exploit synergy with other projects.

What You Need to Know

Well-chosen mobile worker applications can be good investments – even in a recession – but the business case will be scrutinized more closely. Organizations can make stronger cases by creating better internal marketing, increasing application value, identifying with recessionary imperatives, choosing lower-cost technologies, seeking leverage and reducing risk.

Analysis

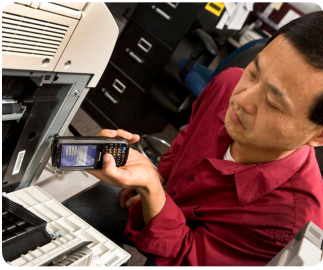
The cost justification of a mobile application project will be much more difficult when spending may be capped and management is disinclined to invest. A recession is a bad time to ask for money; however, it is not an impossible time to ask for money. Here, we explore ways to go beyond simple return on investment (ROI) to make a persuasive case for mobile applications during a recession. Our focus here will be business-to-employee (B2E) applications for mobile and remote workers.

What is different in a recession? A good business case needs to address the special challenges of a recession; these apply to all application types, not just mobile, and include:

Fewer resources. Constrained resources in a recession include both capital and staffing. Competition for funding will be tougher. In some cases, zero capital budget is available, but even that does not have to be a deterrent to all mobile projects.

Decision politics will be more complex. All projects are political, but in a recession, the politics may get worse. There may be more gatekeepers with veto rights. Projects may have more decision and review points. Basically, this means that a business case must not only be financially sound but politically and socially persuasive. Issues such as internal marketing and PR will be more important.

More external considerations. Projects will be impacted by broad corporate initiatives such as hiring freezes, staff reductions or cash conservation. However, not all of these are inhibitors to mobile applications. For example, a mobile field force automation system might reduce the inventory of spares and thus conserve cash.



Organizations are more risk-averse. In a risky external climate, organizations will be less keen to undertake risky projects or deal with risky vendors, however high the potential ROI.

Five steps to a persuasive business case. A recessionary mobile business case needs to address the issues noted above with a mixture of reason and persuasion. It will need several components:

An excellent traditional business case. The format in which cost justification is delivered will depend on the organization's conventions, but it must be something that would be considered excellent in those terms even before the recession – for example, delivering an ROI in six to 12 months. In a recession, the classic part of a B2E mobile business case will likely rest on cost savings rather than revenue growth.

Identification with recessionary imperatives. We mentioned above that organizations acquire new imperatives in recessions, such as reducing head count, cutting spending, achieving extra discounts from suppliers or conserving cash. A persuasive business case must show how mobility can address one or more of these to maximize its political and financial credibility.

Maximum depth. A persuasive business case gives the impression that there are many additional reasons to adopt the project beyond those that were costed in detail. Identify as many mobile benefits, both tangible and intangible, as possible to provide the impression of depth, which will maximize the likelihood that every gatekeeper will find something to like.

Synergy. For example, using a mobile device for multiple purposes will support the business case and maximize the number of people who want the project approved.

Low risk. Choose low-risk mobile business cases, such as those in which you can give examples of similar systems already deployed. But be prepared to apply extra effort to reduce the perceived risk even further by using the techniques suggested below.

These five steps are common to most business cases in a recession. However, many tactics exploit the special characteristics of mobile/wireless technology and the projects that support them.

Tactics to support recessionary business cases. Tactics that help justify mobile worker applications in a recession include:

Achieve staff savings through new mobile working practices. Any mobile application that improves efficiency usually changes working practices, which, in turn, often offers an opportunity for staff reduction or redeployment, which, although painful, may be unavoidable in a recession. For example, a mobile inspection application could enable a worker to inspect more sites per day because information could be collected more efficiently, so less-frequent trips to the office would be required. This might result in a need for fewer workers.

Think like an accountant. Mobile applications and working practices can often support recessionary accounting goals such as faster capital turnover, expense reduction, or cash conservation. Many mobile applications deliver financial value from accelerated business processes. For example, remote workers can enter their timesheets while on a client's premises, and trigger invoices a day earlier to improve cash flow. Mobile applications that enable remote engineers to order spare parts more quickly may allow inventory reductions without compromising service guarantees. Machine-to-machine (M2M) telemetry using cellular networks can allow machine faults to be diagnosed remotely without incurring the cost of an on-site engineer.

Use employees' devices. Some simple applications can be delivered onto employee-owned devices, eliminating the need for the enterprise to buy and manage devices. Usually, this will require low total cost of ownership (TCO) architectures such as thin clients. Application examples include management dashboards and some forms of mobile e-mail.

Adopt low-TCO mobile architectures. In general, thinner mobile application architectures have much lower TCO than thicker architectures because there is a reduced need for system management and security tools. Organizations delivering applications in urban areas with good signal coverage should explore thin-client, messaging and "no client" architectures to reduce costs. If out-of-signal operation is required only rarely, consider whether a manual fallback (such as paper forms) would allow the deployment of a low-TCO thin-client application.



Explore low-cost devices. In a recession, consider whether a simpler application delivered on a very low-cost device would provide most of the potential value at a much lower cost than a high-end device running a more sophisticated system. However, as always, consider TCO rather than purchase price, as this will reflect the fact that low-cost consumer devices may lack features such as system management and are likely to be more unreliable than professional devices.

Broaden the cost justification, and identify as much evidence as possible. Identify intangible and hard-to-quantify mobile benefits such as increased agility, improved customer satisfaction, improved employee quality of life or better internal communication. Communication improvements can often be achieved at low cost by bundling mobile e-mail, instant messaging (IM), or presence with a mobile business application and may be valued highly by staff. Look for supporting evidence from unconventional sources; for example, quotes from customers who might benefit from the improved customer service delivered by a mobile application. It is not necessary to quantify all these benefits, but their presence helps provide depth to the business case to impress more gatekeepers.

Look for regulatory imperatives. Few things motivate executives more than the law. So look for imperatives driven by legal and compliance requirements. In the mobile context, examples include logging e-mail and instant messages for compliance purposes, conforming to lone-worker regulations such as being able to call for help, tracking the number of hours per week that employees work, or being able to send information such as new regulations to remote workers promptly and receive positive confirmation that they have read them.

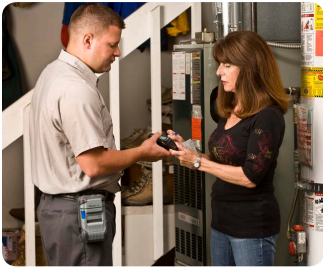
Squeeze suppliers, but not too much. Suppliers may be more flexible on price and terms in a recession, but it can be a mistake to squeeze them too hard because they are suffering, too, and you need them to remain in business. Try to understand which of your potential suppliers are in the most danger. For example, network operators generate cash even in a recession and seldom go bankrupt. However, some mobile software suppliers, such as packaged mobile application vendors, can be small companies with a single product and revenue of only a few million dollars per year that have limited flexibility and may be vulnerable to recessions.

Put extra effort into risk analysis and risk reduction. Organizations are more risk-averse in a recession, so identify and analyze recession-related risks in more detail. Identify contingencies for all the key risks to prove that the business case is robust. In the mobile context, key risks might include supplier failures or a shorter than expected life for hardware that might be prematurely discontinued by suppliers trying to cut costs.

Find low capital expenditure (capex) funding. Many mobile applications can be funded in low capex or zero capex ways – for example, using some form of subscription or software-as-a-service (SaaS) model. One advantage of mobile applications is that many suppliers – such as network operators – are very familiar with subscription pricing models, and application vendors frequently provide SaaS options.

Choose simplicity over functionality to reduce costs. Consider off-the-shelf packaged mobile solutions with less customization to reduce upfront investments because a simple solution may be better than no solution when budgets are constrained. For example, sending work orders by mobile e-mail is likely to be better than filling them out on pieces of paper. Consider generic mobile tools rather than custom systems. For example, mobile form tools such as Pendragon may be acceptable low-cost substitutes for custom data collection applications.

Look for extra value. Try to find extra value that can be extracted from a mobile application, device or mobile working process to boost the business case – for example, by collecting extra information or adding additional functions. For example, one mobile system supporting engineers who maintained beer pumps in bars was extended to collect data about which beers were on tap in the bars, thus providing competitive intelligence. Mobile devices with GPS can optimize staff routing to reduce fuel costs. Mobile handsets with unlimited data plans can serve as remote-access modems reducing Wi-Fi "hot spot" and hotel broadband charges.



Find synergy with other projects or cost-saving initiatives. Mobile devices can often participate in several projects or initiatives to improve the investment case – for example, disaster recovery where mobile devices can be used to contact staff in an emergency. A copy of the disaster recovery plan can also be stored on handheld computers, ensuring that everyone has up-to-date information at all times. Mobile devices can support telework as well as specific applications, thus saving office space, reducing costs and contributing to environmental initiatives. Handheld computers that run applications can also support IP voice as a cost-saving alternative to either desk phones or cellular phones.

Exploit staff flexibility. Most mobile worker applications that deliver a high ROI do so partly because they change working practices. Staff may be more flexible about changing their behavior in a weak economy.

Prove the business case. We estimate that less than 15% of organizations validate the business case after an application is deployed. Offer to do this to show confidence in the application. Alternatively, build metrics into the mobile application to monitor worker performance to prove the business case. External review of a mobile business case, such as by Gartner analysts, can help identify weaknesses, suggest value opportunities and add credibility.

Do better internal marketing. All projects require internal marketing, and it's particularly important that mobile projects get commitment from all stakeholders. Just as anyone selling a product tries to gain a greater understanding of customer needs during a recession, try to better understand stakeholder needs and what evidence they require to authorize an investment. One advantage of mobile devices is that people generally like to play with them. So look for a way to get the devices and applications into the hands of potential users to generate enthusiasm. For example, arrange loan devices for key stakeholders.

Look for network operator support. Many network operators are trying to break into the application marketplace and they may be supportive; for example, loaning mobile devices for trials or arranging demonstrations of mobile applications from key partners.

Look for government aid. In some countries, governments will try to boost the economy with a range of initiatives designed to encourage investment and support employment. Some of these, such as support for IT training, might help to fund mobile projects.

Enable flexibility during and after the recession. Well-designed mobile working processes will typically be more flexible than their manual predecessors – for example, being able to dynamically route service cases "over the air" to any available field engineer. This has advantages in a recession if staff cuts are necessary, and after a recession when the organization is scaling up again.

Key Facts

Mobile B2E applications can deliver good ROI, even during a recession.

A business case for investing during a recession must be more sophisticated, more comprehensive and more persuasive than in normal economic times. Fortunately, many mobile worker applications can support recessionary business goals.



Glossary of Terms

ISP – Internet Service Provider – These can be local companies or nationwide providers of residential or commercial internet services.

PM – Preventive Maintenance – Field service work oriented around sustaining equipment operation.

WMS – Work-order Management System – An end to end system for managing service work from the initial customer call to service completion.

SLA – Service level Agreement – A contract with the customer committing to certain requirements including response times and return-to-service expectations.

AVL – Automatic Vehicle Location – A system used by dispatchers to see where their workforce is located. Coordinates are typically fed real time from a GPS module located on the vehicle or in the mobile computer.

TCO – Total Cost of Ownership – Comparing fixed costs and variable costs to gains in productivity and other financial savings over time.

TCE – Total Customer Experience – Intermecc's "3 P's" lifecycle management model including elements to Prepare (plan the deployment of the solution), Perform (execute on the deployment of the solution), and Protect (support for the solution).

SaaS – Software as a Service – Model for providing an application that is deployed over the internet and/or is deployed to run behind a firewall on a local area network or personal computer.

Cloud Computing – is Internet-based computing, whereby shared resources, software, and information are provided to computers and other devices on demand.

ISV – Independent Software Vendor – Software developer who creates and sells software products that run on one or more computer hardware or operating system platforms.

MEAP – Mobile Enterprise Application Platform – Vendors focused on providing software for mobile computing devices such as smartphones, ruggedized handhelds, notebooks and tablet PCs.

ERP – Enterprise Resource Planning – Integrated computer-based applications used to manage internal and external resources, including assets, financial resources, materials, and human resources.