WHITE PAPER

SELECTING A DYNAMIC SCHEDULING ENGINE FOR FIELD SERVICE MANAGEMENT

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Companies considering implementing enterprise technology to optimize field service scheduling and management have a wide range of options, with a variety of software applications available to help manage the route and schedule of field service technicians and others that need to be dispatched to remote sites in order to carry out their work.

To help you make sense of the choices, we think about three distinctly different approaches to solving the puzzle of getting the right people to the right place at the right time. These three different strategies which are adopted to enable better field service scheduling plans to be made are described in this paper. Which of these strategies is right for you? That would depend on a number of variables, including the number of technicians, the number of jobs each technician handles in the course of a day, the degree of time sensitivity of each call and the degree to which the schedule may change during the day. It is also important to consider that the demands placed upon a field service application today may change quickly due to business growth, customer demands or competitive pressures. It is essential for a business or organization to select and implement field service scheduling technologies adequate for future as well as current needs.

MANUAL APPROACHES

In an environment characterized by low volatility and a slow business rhythm, it is perfectly possible to schedule field service crews manually—and not rely on software tools at all. In any number of industries, or a start-up company, without a lot of technicians in the field or a significant number of customers or site visits, it is reasonable to schedule technicians manually; relying on no more technology than pieces of paper and a few highlighter pens. The paper is typically ruled into squares with technicians' names down the left-hand side and time slots across the top. In each cell of the matrix are data reflecting the job that is to be handled by that tech in that

time slot. The dispatcher will allocate newly arrived jobs into the empty slots, until each technician's day is full. This is obviously field service scheduling at its crudest level, but that is the starting point for many companies.

A subsequent iteration of this manual approach would be to use an Excel Spreadsheet, which is basically the same thing as the static, paper-based chart, but in an electronic format. Whether the tabular data is kept on a sheet of paper or in a spreadsheet, and even if the schedule is transmitted or visible electronically to techs in the field, the scheduling activity itself is still manual. The decision-making is still done by a dispatcher (or equivalent role) with a list of technicians to manage, and needing to pair those technicians with a stream of incoming work. The dispatcher decides which tech gets which of the jobs as they come in.

As suggested earlier, manual processes may be an adequate or even the preferred solution in situations where there are a smaller number of technicians, each technician is undertaking only a few jobs per day, and when those jobs are unlikely to change in priority, in sequence or in scope during the day.

Where manual scheduling processes start to fail is when volume, complexity or volatility increases. When the schedule changes during the day, increasing volatility, it becomes very difficult to reconfigure a whole day's schedule—given the number of different dependencies, geographic distances and demands of each individual piece of work. As the number of technicians increases, a single dispatcher will quickly become overwhelmed, and a company will be faced with investing in additional personnel to manage their techs. Our experience indicates that, using manual systems, a single dispatcher can manage 15 or, in the most optimistic situation, 20 technicians. What this means is that a company with a growing field labor force can expect to hit some hard constraints that require either hiring more dispatchers, or investing in some form of field service scheduling automation.

Complexity in the process can also increase in a number of ways. Making the right decision becomes more difficult if you have got to consider where the techs are located geographically, the nature and scope of the work they are doing, what skills or certifications are required, which certifications or skills each tech possesses, which shifts they are on, which spare parts they may need for the job, what is the service level agreement (SLA) for this particular site/asset/type of problem, the location and access to this site, and so on – field service scheduling is truly a multi-dimensional problem.

SLAs, and particularly in the B2B environment, can add massively to the decision-making criteria. And the trend is for them to become more complex as customers are demanding ever-increasing levels of service, a lower tolerance of failure and a consequent higher propensity to switch service provider. SLAs vary by industry, asset-class, time, customer, site and individual and the ability to honor those agreements reliably requires an ability to manage people, locations, routes, qualifications and other dynamics in real time.

As the difficulty increases in one or more of these dimensions, it becomes genuinely challenging for even an unlimited number of dispatchers to manage a schedule manually, much less make reliably smart decisions across many technicians, and the hundreds of jobs per day that must be juggled on behalf of those technicians.

While a company continues to rely on manual processes in the face of complexity and volatility, we see some specific types of sub-optimal responses. Dispatchers adopt strategies to make decisions simpler and easier to cope with, by focusing on a sub-set of the requirements. One mental shortcut that many dispatchers rely on is, for example, to simply send the nearest tech to each job. Dispatchers may also wind up making scheduling decisions based on personal matters, and not focus on the overall business objectives. "I know full well that Jim does not like going to that part of town on a Friday afternoon because he wants to be close to home to collect his kids from school," a dispatcher may think, "so I won't send him there." But these shortcuts do not take into consideration other variables, including the qualifications or certifications of each tech, what an optimized driving route would be in the course of the day, what materials or parts a tech would need to have on the truck and SLAs that may be in place for each customer.

Decisions based on these human considerations may be acceptable, or even desirable, but they are not recorded in any enterprise system and exist only as tribal knowledge that is hopefully passed on when a new person takes over the role. This places a great deal of emphasis on the relationship between the dispatcher and the techs, and a lot of reliance on the skills and knowledge of the dispatcher him or herself. One customer has told us that it takes them two years to get a dispatcher up to speed enough to completely understand the environment and can carry out the job fully and effectively. Two years is a very long training period and a very costly apprenticeship, but the cost of this ramp-up can be reduced once a company gets away from a manual approach to scheduling and dispatching.

AUTOMATING RESOURCE SCHEDULING

At some point in a field service department's development, they find they need to start automating some of the decisions involved in creating the schedule. Often, this will involve a home-grown development by the internal IT staff. To a technologist, it looks like a fairly simple problem to solve. There are a number of jobs, and a number of technicians—it should be fairly simple to automate the process of matching the two up in an optimized fashion. Maybe the IT department even employs someone with a math background, who can figure out some algorithms to employ to build a schedule that is better than the manual equivalent.

This is a noble thing to attempt, but the scheduling systems that result are very prone to error and miscalculation because these types of algorithms are extremely hard to do well. These home-grown systems tend to be unstable and unreliable, and also inflexible to adapt to the changes that will inevitably affect the business.

To a large extent, many packaged software products that purport to offer automated field scheduling fall into this "traditional" scheduling automation category as well. Even many of the scheduling engines that are part and parcel of high-end, top tier enterprise software really just take a manual scheduling process and automate elements of it so that it works a little bit better—aiming to automate something like 80% of the decisions. But again, once you start to introduce more complexity into the equation, including rapidly shifting schedules that require algorithms to update a schedule in real time instead of a day or more in advance, traditional automated solutions begin to fail. Why is this? While the algorithms behind these systems may seem like rocket science to a lay-person, they are not sophisticated enough to reflect the reality of field service. They cannot schedule and reschedule in real time fast enough to keep up with shifting workloads, traffic patterns, delays, adverse weather, new or changed demands, technicians going off sick, and the gamut of other variables. These traditional scheduling automation systems are the equivalent of a 12-year-old who, using simple algorithms from YouTube, can solve a Rubik's Cube puzzle, given enough twists and turns.

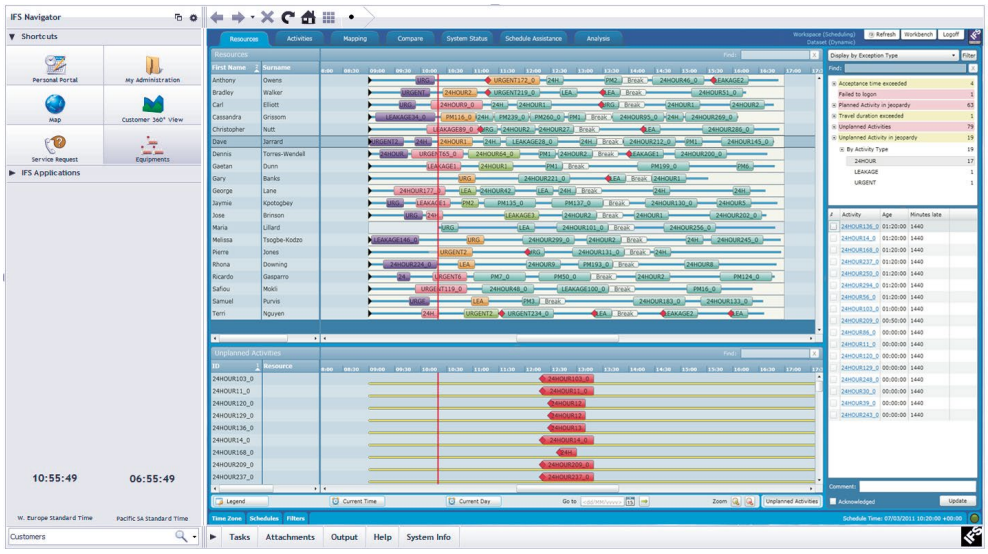
But using more advanced and specific algorithms, it is possible to solve that same cube at lightning speed in just a few movements. And that is exactly where we are going with our third and final strategy.

A traditional scheduling system, particularly if built in-house, may need to work for hours to arrive at a schedule, and must spend additional time "thinking" each time the scheduling puzzle is changed. So while traditional scheduling can bring some degree of automation to a field service organization, it fails as volatility or customer service demands increase to the point where the schedule must be optimized in real time to achieve satisfactory delivery performance.

REAL-TIME SCHEDULING

Companies often fail to realize that their own business environment is very complex or challenging. After all, it may have developed over a long period of time, and the executives typically have grown up with it, and adapted gradually to each tiny change —failing to recognize the overall situation properly. And the consequences of this lack of insight can be dire.

I recently met with the finance director of an independent service provider involved with maintaining aviation equipment. They recently missed their contracted SLA commitment and he had to write a check for $250,000 as a penalty payment. As it turned out, it was just one job in several thousand that had tipped them over the edge and into non-conformance. If someone had been able to identify that particular job as one of critical importance and fixed it in time, a substantial penalty could have been avoided and the loss of reputation as a reliable partner avoided. This could not be achieved without sophisticated, automated tools with sufficient awareness to recognize the danger.



The IFS Mobile Workforce Management multi-workspace Scheduling Workbench offers performance visibility and real-time tools for exception tracking and resolution.

In complex environments, scheduling needs to be automated so that the vast majority of service calls and projects happen without manual intervention—at IFS Mobile Workforce Management we aim for 95%+. This frees the dispatcher and other key personnel to truly manage by exception, focusing on the handful of situations that really require their attention. Recognizing these criticalities amidst hundreds or even dozens of jobs cannot be done either with manual systems or traditional service automation as neither is responsive enough to facilitate decisions in light of the changing circumstances. Not only does a scheduling automation system need to re-optimize the schedule in real-time as things change, but that scheduling system must provide insights that help executives identify contracts or customer relationships at risk to ensure that these particular customers get appropriate priority. As we have seen, the consequences of what looks like a trivial SLA miss on an individual job may be huge.

Real-time scheduling systems are built on very different algorithms than traditional scheduling software. From the ground up, these more advanced products rely on algorithms that are tuned for precisely this environment by individuals with a thorough understanding of how to integrate service logistics and spare parts with skills management, with resource availability, shift management and other dynamics that are all changing in real-time. While traditional scheduling could ostensibly solve this puzzle given enough time, they are only able to batch update the schedule at specific intervals. Real-time scheduling systems always have an optimized plan available, one that is up-to-date with all the latest data and field intelligence.

This does more than give a field service team the agility to adjust to fluctuating service demands. It also gives a manager or executive—or even a customer—access to get the latest, updated information. This facilitates better decision-making internally, and externally allows the customer to view anticipated arrival time of the tech, providing reassurance and preventing progress-chasing contacts. Up-to-the-second information from the field from tech's PDAs, smart phones and even GPS on the vehicle itself allows the always-optimizing engine to adjust the schedule as techs travel on the highway, maybe get stuck in traffic or are delayed engaged in a job on site that may be more complex and time consuming than anticipated. This is a whole new way of thinking and actually represents a change in strategy in terms of how you assign work to technicians in the field, communicate with customers, and manage customer expectations and SLAs.

The difference between traditional scheduling automation and real-time scheduling automation is that the traditional approach essentially tries to take those manual processes and make them more efficient. In the meantime, real-time scheduling comes at the problem with a different mindset, a different way of approaching the problem, by first defining customer value and service requirements and then feeding information into a system that can maximize delivery of that value while minimizing cost to the company.

Let's look at an example of that difference in action. A service call for a mission-critical piece of equipment with an SLA of one hour call-to-fix means you have one hour to arrive on site and fix the problem. Initial diagnosis in the contact center indicates that the problem the machine is experiencing typically takes 20 to 30 minutes to fix. That means there is only 30 minutes to get a technician on site. In that situation, the odd minute or two to make that decision could mean making the difference between actually achieving the service level or not. Of course if you have a scheduling engine that takes 10 minutes or even longer to make the calculations and arrive at a decision about which technician to send, really, you only have 20 minutes —or less for the technician to travel. Which might not be enough time, and your traditional scheduling system therefore increases the chances you won't have anyone close enough to actually make it on site within that service level. Those 10 minutes alone could spell the difference between a satisfied customer and a potential contractual penalty or lost customer. Of course many traditional scheduling engines take a lot longer than 10 minutes to make a scheduling adjustment. So, there is a tremendous business value difference compared to an always-optimizing, real-time scheduling engine built on the most advanced algorithms. What price do you put on customer retention and loyalty?

CONCLUSION

Understanding, these three distinct field resource scheduling strategies ought to help you evaluate various software products on the market by placing them into various categories, and evaluating your requirements against them. Solutions in each category have a place, but it is up to each company to determine not only what their current needs are, but what demands will be placed upon their field service functions into the intermediate future.

Manual processes may be preferred for start-up companies, or those whose field service functions involve low volatility, complexity and scale. Traditional scheduling automation will be sufficient for organizations who want to simply drive incremental efficiencies in their manual scheduling processes.

But once a business has firm SLA commitments, high volatility, complexity and a large field scheduling force, only real-time scheduling technology will be viable for them.

ABOUT IFS

IFS is a globally recognized leader in developing and delivering business software for enterprise resource planning (ERP), enterprise asset management (EAM) and enterprise service management (ESM). IFS brings customers in targeted sectors closer to their business, helps them be more agile and enables them to profit from change. IFS is a public company (XSTO: IFS) that was founded in 1983 and currently has over 2,600 employees. IFS supports more than 2,200 customers worldwide from local offices and through partners in more than 60 countries.

For more information about IFS, visit **www.IFSWORLD.com**

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