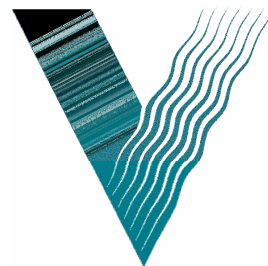


Mobile Workforce Management

**Understanding the
Benefits of Optimization**

A ViryaNet White Paper



VIRYANET

EXECUTIVE SUMMARY

Increased competition and the derived higher customer expectations dictate that we cannot continue doing business as usual. Tighter Service Level Agreements (SLAs), coupled with lower service charges, result in thinner margins. The only way to address these challenges is by reducing service costs and achieving higher productivity.

Toward that end, organizations must utilize solution technology that:

- Enables field employees to spend more time working on jobs rather than traveling between jobs.
- Lowers the dispatcher-to-technician ratio by keeping the number of exceptions to a minimum.

Shorter response times driven by the SLAs, more accurate arrival times and smaller time windows for appointments, more telephone calls to dispatchers for updates, all impede these goals.

In addition, internal considerations also introduce problems. Work must be balanced fairly between technicians, both quantitatively and qualitatively, time must be set aside for lunch, there may be union rules restricting workloads, and overtime must be kept to a minimum.

The solution (Aberdeen): tightly align service demand — comprised of the backlog and pipeline of work orders — with service supply — comprised of technician capacity, proximity, aptitude, and inventory.

The goal: achieve the most cost effective, productive, and profitable service chain at all times, in the face of myriad planned and unplanned constraints and interruptions.

To achieve this, best-in-class companies have found that field service optimization must occur in real-time, and therefore, must be aided by technology solutions that can calculate optimal workload allocation amidst unplanned service chain interruptions, based on pre-defined and prioritized constraints.

Dispatchers are reluctant to buy into service optimization technology solutions, not just because one of the goals is to reduce dispatcher-to-technician ratio, but because they are used to working a certain way that may dramatically change when using a technology solution. They may argue that their experience with the technicians, their familiarity with the customers, and the nature of the work cannot be matched by a computer system.

MAN VS. MACHINE

The diversity of customers, the complexity of the work with myriad types of jobs, the diversity of the capabilities of your workforce, the delays and emergencies encountered on a daily basis all make scheduling a complex matter. Dispatchers will often tell you that they can do it better. They say that their years of experience with the technicians, the customers, the geographical area they are responsible for and the nature of the work cannot be matched by a computer system, however intelligent.

But is this indeed the case? It cannot be denied that there always will be cases where the dispatcher will look at the solution determined by an automatic scheduler and find a fault or show how they could have done it better. An automated system may not be able to schedule a 20-minute job because there is no free availability, but the dispatcher may know that in reality the technician will be able to do it without incurring overtime.

However, when looking at the big picture, the ROI achieved when comparing a manual schedule with an automated schedule with the same set of data and constraints leaves no room for doubt. The reduced travel time and the increase in number of jobs scheduled achieved by the automated scheduler are significant. Let us examine this in more detail.

The years of experience that a dispatcher has are very valuable, but at the same time this creates a great dependency on him and results in a very long learning curve for new staff. On the other hand, scheduling solutions that provide a rich data model can capture to a large degree the know-how that sits in the dispatcher's head. Consider the following examples:

- Defining each technician's skills and efficiency level accurately
- Defining particular customers you want serviced by a certain set of technicians
- Defining the system rules to determine the estimated job duration as accurately as possible based on all the relevant considerations
- Defining what it will take to solve the problem (which skill, which tool etc) based on the information provided

Typically, dispatchers are assigned to a certain geographical area, often based on the organizational hierarchy, for example: reporting centers or regional districts. Each dispatcher knows her area very well, and may be able to produce an optimal schedule for their area. But how optimal is this when looking at the company as a whole? What are the odds that within each area the workload for the day matches the technicians responsible for the area? If the workload is higher, SLAs and appointments will be jeopardized and technicians will work overtime. If the workload is lower, your technicians will be underutilized.

Furthermore, the breakdown into geographical areas creates artificial boundaries. A technician in one area will not be assigned to a job in an adjacent area even though the job may be around the corner and the nearest technician in that adjacent area is miles away.

Often, different dispatchers will cover the same area but each will handle different job types, for example: one dispatcher will handle jobs relating to hooking up new customers to the electricity infrastructure and detaching leaving customers from the infrastructure while another dispatcher will handle jobs relating to cutting off supply for non-paying customers and subsequently reconnecting them after they pay. In terms of the nature of the relationship with the customer these may be different worlds, but as far as producing an optimal scheduling solution all these jobs should be viewed as one pool that can be handled by one pool of technicians.

As your business grows and the workforce with it, you do not want to keep the dispatcher-to-technician ratio constant by hiring more dispatchers. As well, dispatchers already have their day full and will not manage the increasing workload as efficiently as they handle their work today.

A good scheduling solution will allow you to manage the increased workload while keeping your capable dispatchers free to handle the emergencies and the unexpected situations.

ENSURING CUSTOMER SATISFACTION

Increasing customer expectations make it increasingly difficult to meet all the commitments with the workforce you have, let alone optimizing the workforce in order to cut costs. A scheduling tool provides a tremendous opportunity to cut costs and improve profitability by producing optimal travel routes that reduce travel time and increase the number of jobs scheduled.

To provide a simple illustration of this, let us say that you need to perform two jobs in the same building on a particular day. No doubt you will want to send one technician to deal with both jobs. However, you may discover that the two jobs have different skill sets and there is no technician who has both skill sets, so you have no choice but to send two technicians. What happens though if there are technicians who have both skill sets, but one job was scheduled for 9 AM and the other job for 4 PM?

Now unless those two jobs were appointments committed to VIPs who demanded those exact times, this situation clearly should not have arisen. The reality in many companies, however, is that such commitments are made to customers on a regular basis, perhaps not to two customers in the same building but certainly close enough to each other for one technician to have covered both jobs. Call centers have their own challenges and are measured not only by how quickly they respond to calls but also by the length of the call, so they need to offer the customer within a matter of seconds a range of appointment slots from which the customer can choose. To meet these requirements, the slots offered are simply predefined blocks of time per area, job type, etc., that gradually fill up, without considering other commitments, real travel time, and skill sets.

This situation creates significant constraints for the scheduler. To resolve this problem, the scheduling tool must provide a solution at the appointment booking stage and check the scheduling implications of each slot offered, in terms of previous jobs scheduled, travel time, and skills required. The quality of the solutions offered is spread over a wide spectrum; we will discuss the considerations and capabilities that may or may not exist in different solutions.

Life would be simple if we could offer the customer an appointment slot spanning the entire day. This would give the scheduler ample room for optimization of routes. However, the reality is that even solutions offering AM and PM slots are simply no longer acceptable –customers refuse to accept that a technician will come some time between 8:00 and 12:00 when the job will take exactly 5 minutes. The scheduler must be able to offer smaller slots. Going one step further, the slot size should not be one standard size but should depend on the estimated duration of the job e.g. an 8:00 – 9:00 slot for a 45-minute job, a 9:00 to 9.30 slot for a 15-minute job.

Thus, instead of the appointment booking driving the quality of the optimization, the quality of the optimization-to-be is driving the appointment booking. A wide range of slots must be offered to the customer for increased customer satisfaction, but the scheduler should mark the slots that are ideal in terms of the quality of the optimization-to-be so that these are offered to the customer as first choice.

Customer satisfaction begins with the quality of the commitment provided at the outset, continues with the technician meeting that commitment and preferably notifying the customer a short time in advance that s/he is on the way, and concludes with the quality of the work performed. It goes without saying that the technician will have the right skill set to do the job, but how efficient is he? If this is an important customer, the expectation is that the technician will be experienced and get the job done well and in the minimum time necessary. Does the technician have the necessary tools and spare parts to do the job right the first time without having to return for a follow-on visit? In the event that a follow-on visit is required, will the same technician come back the second time?

MANAGING THE EXCEPTION

The role of the dispatcher should be to handle the emergencies and the unexpected. As we will show shortly, even these can be handled automatically to a large extent, but since there will always be exceptions, your dispatchers must have the tools to efficiently manage them.

Generally, we find that companies run the optimizer at night to produce the schedules for the following day. The system can spend hours producing different schedules and selecting the most optimal schedule. The natural question is: to what extent does the actual schedule carried out resemble the predetermined plan? In general, this depends on the percentage of same-day calls i.e., calls that must be scheduled the day they are logged. This depends in turn on the nature of the business and also on the SLAs promised to customers.

The higher the percentage of same day calls, the higher likelihood that your schedule quality will be compromised. This situation exists because the system needs to provide a fast solution to the same day calls even though the schedule may already be full. Generally, same day calls will displace other calls that can be compromised. You can prevent this by not fully utilizing the technician capacity when running the night optimizer (leaving 20% room for same day calls). But this solution also has shortcomings since that capacity may not be utilized then by all technicians.

Other factors contributing to the fact that the actual schedule differs from the planned schedule include last-minute job cancellations and reschedules, technicians reporting ill at the last minute, and jobs taking significantly longer or shorter to complete than expected.

All these changes to the schedule will not necessarily require manual intervention. Invoking real-time localized optimizations when such events occur can, by and large, provide a satisfactory solution, but there will always be the exception, be it the emergency job that simply cannot be scheduled because the only suitable technicians are consumed with urgent work, or the customer appointment that will be missed because the technician is delayed at a previous job.

On occasion, it can be more drastic (you suddenly need to send half your workforce to handle a large-scale emergency). In such a case, the system must handle the new workload while at the same time deal with the critical work originally scheduled. Your dispatchers will no doubt need to be involved (contacting the customers whose jobs have been delayed). Compare the case where this is all they are doing to the case where they are doing this while at the same time frantically trying to “put out the fires” and make sure no critical appointments or high-penalty jobs are not attended to.

Providing as much automation as possible and keeping dispatchers' work to a minimum, is the first step. The second step is to provide the dispatcher with tools to handle exceptions quickly and efficiently. These exceptions must be “pushed” to the dispatcher without the dispatcher having to search for them, all the necessary information must be available instantly, and there must be a minimum number of steps required to assign them.

Necessary tools include such features as:

- Identifying the most suitable technician for the job
- Enabling map-based dispatching that provides the dispatcher with real-time map locations of the technicians and jobs in the area
- Dragging and dropping within the map display user interface

COMPLEX WORK

The complexities and challenges described throughout this paper are significantly compounded when the jobs at hand are not simple two-hour jobs that are performed by a single technician, for example. Complex work may require multiple technicians to work on the same job at the same time, and may involve work that spans over a number of days but not necessarily in a continuous manner, for example: road repair work that must be done during certain hours of the day. The scheduler must be able to group technicians for the job while at the same time ensuring that they are not under-utilized because of the time constraints imposed on the job.

Consider a multi-day complex job that requires a few specialized technicians as well as some unique equipment. The customer may request from you different options as to when the job could be started. *The scheduling tool must be able to guarantee that the required technicians and equipment can be reserved for this job without impacting other work. This process must be repeated for each of the optional start dates that the customer is offered.*

Consider another case where a crew of technicians has been assigned to a multi-day job. At the last minute, work scheduled to another crew is cancelled, leaving the crew free to work. You will no doubt expect the system to allow you to assign that second crew to the job being worked on by the first crew, with the expectation that the time taken to complete the job will be reduced. This in turn will free up time on future dates, allowing you to schedule other work instead.

LETTING THE SCHEDULER WORK BEST FOR YOU

In order to satisfy your unique business challenges and cater for the nature of the work you handle, you must configure the scheduling tool to achieve the optimal solution for your business. As your business processes change over time, and different considerations come into play, you also must make adjustments to the scheduler to reflect these changes.

The different scheduling constraints relevant for your business must be enabled, those not relevant must be disabled, and any unique constraints you may have should be incorporated into the system without incurring costs associated with significant code changes.

Over and above the “hard” constraints that provide strict rules as to what is allowed and what is not allowed, your considerations and priorities regarding how work should be assigned and optimized can be reflected in the system in order to produce the solution that you want. In the sections above, we described the different competing considerations, from meeting customer commitments and maximizing customer satisfaction to achieving optimal routes that reduce your costs and increase your technician utilization and work satisfaction.

These exact business considerations are modeled in the system so that you can intuitively tell the system how to behave.

The results may not always be what you expected, in which case it's back to the drawing board to reanalyze the business considerations and determine the optimal configuration to give you the best results.

SUMMARY

ViryaNet Optimizer is a proven and powerful scheduling, dispatch, appointment booking, and route optimization product that automatically schedules the right resources and at the right time — based on criteria such as skills and experience, equipment and parts, service-level agreements, drive time, and availability.

ViryaNet Optimizer optimizes your field engineers' schedules, enabling you to deliver service efficiently, and resulting in improved customer satisfaction.

ViryaNet Optimizer is available as a stand-alone scheduling solution as well as an integral component to ViryaNet's industry solutions. ViryaNet Optimizer includes published APIs, enabling rapid integration to a variety of applications.

For more information, contact ViryaNet today.