

Managing the Telco Field Force in the 21st Century White Paper

**How will you serve
your customers today?**

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Remember Frank? That veteran technician who single-handedly was your central office? Way back in the days of the rotary telephone, Frank practically lived in that central office. It was his second home. And you could rely on Frank to solve just about any technical riddle you could throw at him.

In fact, Frank knew that office like the back of his hand. And even if the work order was wrong, he'd somehow find a way to turn up service for the customer. Sad to say, Frank retired 10 years ago, received his 30-year service award, hung up his tool belt for the last time, and retired with his wife to a quiet place in the country. But here's the funny thing. Frank may have "done everything" back then, but if he suddenly showed up tomorrow, he wouldn't recognize the place.

Telecom is not the same old "utility" it was 10 years ago.

Today telecom is a fast-moving business. Competition and new technology have changed the game forever. Not only do you have six tough competitors muscling their way into your territory, but you've also sprinkled a few billion dollars on something called "broadband networks." Not surprisingly, your field service world has seen a major overhaul.

For one thing, the central office is no longer the focal point it once was. Today your plant has fanned out to thousands of homes and businesses. You've got T1 lines, cable modems, DSL modems, and VPNs to deal with. And oh, by the way, you still need to care for the old copper loop, because most of these slick new services absolutely depend on it.

But it's not just the network that's changed. Customer perceptions have changed too. Customers expect more these days – more services, faster response to problems, and tighter scheduling windows. And regulators still enjoy getting into the act: sometimes they even penalize carriers for missing appointments as they did a couple years ago to Pacific Bell in California.

A Field Service Operation That's Fighting Fires

With all the changes and new demands on your field service operation, is it any wonder you have a hard time keeping up? One thing's for sure: if your field service operation is not efficient or can't keep up with the times, your company costs can go through the roof.

Think about it. Every technician you have on the road represents a huge investment in equipment, vehicles, tools, and training.

And that's a mighty big part of your operation. Consider this: at many communication service providers, the field service operation comprises a whopping 50 percent or more of the operating budget. So if you make that operation only 5 percent more productive, you'll do wonders for your company's bottom line. If salary and support costs for 500 technicians equal \$50 per hour, that's a \$50 million yearly expense. Even an operation with only 500 field technicians would save \$2.5 million using this conservative productivity gain.

Those are big savings. And the best way to realize those savings is to better manage your field service operation. And to do that means getting better at a lot of things – workforce planning and scheduling, avoiding unnecessary dispatches, accurately forecasting workloads, measuring and analyzing operations, and communicating in real-time with technicians in the field.

Take a look around and you'll see dollars being wasted because your field service operation isn't taking full advantage of each opportunity to boost productivity. For instance, when a customer calls the trouble desk, the rep simply isn't equipped with the tools to diagnose the problem.

So look at what happens. When jobs are not scoped out well, the technician arrives without the right part. Or you send a cable TV tech to a home when the customer really needs somebody qualified in high-speed Internet. And you know what that means – another wasted truck roll. Excessive truck rolls are dangerous to productivity, and they're deadly to company profits. Every time you roll a truck, the breakeven point for that customer gets pushed back further and further.

Scheduling technicians is also a sore spot. Schedulers and dispatchers do the best they can, of course, but because they're using manual tools and spreadsheets, they can't afford the time to calculate the best possible solution. Besides, there are too many variables to consider – workload balancing, technician skills, and the costs of overtime and travel time – to mention just a few.

As a result it's hard to give a customer an accurate appointment time. It's too bad that "the technician will be there **sometime** tomorrow" isn't good enough anymore.

It's pretty clear where all these inefficiencies eventually lead: to higher costs – increased overtime pay, excessive service contractor fees, bigger fuel bills and eventually, customers walking off to your competitors.

Why Your Current Workforce Management Systems Drag You Down

There's no doubt about it. Your field service costs are out of control with no easy way to control them. So, you ask, "What's the cause?"

Well, you can point your finger at a lot of areas – poor training, lack of investment, clueless regulators, short-sighted management, stubborn unions, or a bad economy.

All these things are certainly contributing factors, in one way or another, to the mess you're in. But if you look closer at the problem, one particular item stands out as the real root of the problem:

The same old "stovepipe" processes and systems you used in the past to manage service operations can't keep up with today's difficult field service challenges.

It's ironic, isn't it? The telecom business is changing like crazy, but the field service systems supporting the industry are playing reruns of Leave it to Beaver.

Plain and simple, your current systems are leaving money on the table because they can't forecast, plan, or schedule your field service resources efficiently.

Having Multiple Systems Means Little Teamwork

Now then, the first system problem you face is a fairly obvious one – a lack of integration between the disparate parts of the operation. And that means you lack the visibility and data flow to act as one unified company.

For instance, you probably have several operations centers, all maintaining their own workforce planning systems, scheduling systems, and databases. Your systems are scattered everywhere. And because those systems aren't integrated with the enterprise, each operations center is its own feudal castle – with a wide moat around it. So what's the result? Operations centers rarely coordinate with one another or share resources.

Here's an example: Anticipating a heavy work schedule in August, Operations Center #1 hires 100 contract technicians to pick up the load. Then, when August arrives, you find 65 technicians in Operations Center #2 sitting idle – folks that could have easily been assigned to fill the manpower shortage at Center #1. And the unnecessary cost of hiring 65 technicians for a month is no small piece of change – it's over a half million dollars!

Strategic Planning... On a Spreadsheet and a Prayer

Not only are your systems lacking integration, but also the tools you're using for field service planning can't give you a picture of your true workload – or an accurate measure of your workforce capacity.

The typical planning process goes something like this: You first run your historical data through a series of spreadsheets to project your annual requirements. Then you fine-tune your plan to account for the sales pipeline, seasonal variations such as weather, and special events such as sports contests and conventions coming to town.

When you've done all that, you roll that data up into one complex spreadsheet that calculates the "capacity gap" you'll need to fill for technicians, equipment, and other resources throughout the year. Fine and dandy, you have a plan. But ask yourself if this is the best plan you could come up with.

Considering the millions – maybe billions – of dollars you'll spend this year on field service, does your plan really **optimize** the use of those precious resources? How would you know?

Well, if you assume your data inputs are reasonably accurate, then getting an optimal solution depends on one thing – *how well your spreadsheet modeled that data and calculated your capacity.*

So let's look at the spreadsheet model and isolate one area – technician skills – and see how it's modeled in your spreadsheet. You know that "technician skills" are an important variable in your annual field service plan. After all, you can't very well do your capacity calculation if you don't know how many technicians are qualified to work on POTS versus complex services such as DSL and Frame Relay.

You know that most technicians have multiple skill sets. And let's say one technician, Jill Smith, is qualified to work on both traditional POTS and DSL service installations. So how do you represent Jill's capacity for each skill or type of work in a spreadsheet? Do you consider her as 100 percent POTS and 100 percent DSL? No, that would count Smith as two people.

How about entering Smith as 50 percent POTS and 50 percent DSL? No, that's also wrong because it fails to show Smith's true versatility. Smith could work a full year on DSL service alone if you wish.

Do you see the point? No matter how hard you try, a simple two-dimensional spreadsheet can never adequately represent Smith's skill capacity! And when you multiply that problem across hundreds or thousands of field technicians, you realize that any plan a spreadsheet gives you is an intelligent guess at best. And "guesswork" spells all sorts of problems, such as backlogged work, underutilized techs, and repair delays that anger customers. Why worry about the competition when your own planning system is working against you!

Introducing Optimization Software

Believe it or not, the answer to all of these field service operations problems is now available – a whole new category of software called **service optimization software**.

To be honest, service optimization software is not totally new. Actually, workforce optimization has roots in something the Allies pioneered in World War II, a field called **operations research**. The purpose of service optimization is quite simple: it helps you make fast and accurate decisions that increase the efficiency and effectiveness of your workforce.

Where service optimization really pulls its weight is in places such as field service planning and scheduling ... places where you have *thousands of factors* and *billions of outcomes* to consider. Even in an operation with 25 technicians, the number of decision points can be in the millions – so it's a formidable computing challenge. In fact, service optimization enables you to optimize the assignment of thousands of technicians, trucks, equipment, and other resources – balancing cost and service levels to achieve the best service, at the lowest cost.

Not only that. You might expect a high-speed computer to take minutes, maybe hours, or even days to compute a problem that complex. However, optimization software can optimize a schedule, and dynamically re-optimize a schedule, in only a few seconds – fast enough to keep up in real-time with changing events in the field.

Service optimization solutions differ dramatically from other service **automation** solutions. They are truly the breakthroughs that analysts and many of the world's largest telecom service operations say they are.

The Multidimensional "Traveling Salesman" Problem

People have tried to apply mathematical models to human decision-making for at least 200 years. Perhaps you've heard of the classic operations research question, the "traveling salesman" problem: If a salesman must visit all 48 capital cities in the continental United States and visit each city only once, what path should he take to yield the shortest overall distance?

Interesting problem isn't it? It's simple to state of course, but if you spend a little time with the problem, you'll quickly see what a brainteaser it is. That's because there are literally millions of unique travel paths the salesperson can take ... but only one **optimal** path. Many mathematicians have spent a good part of their careers trying to find the answer. But notice that in the traveling salesman problem, **only one factor** – distance – must be optimized.

Compare that to field service optimization where you have **hundreds of factors** – travel distance, travel time, overtime costs, labor costs, customer availability and preferences, contractor availability, and others to deal with. So a multidimensional problem such as yours makes the one-dimensional traveling salesman problem look like child's play.

Workforce Scheduling: Job Matching versus Optimization

"OK," you say, "I'll admit that solving a multidimensional problem is extremely complicated, but people at our organization are already using software to make field service decisions everyday. So why is this thing called optimization software any better than what we already have?" That's a good question. The simple answer is that calculating optimal decisions overwhelms the capabilities of traditional systems.

"But how?" you ask. Well, it's a little complicated to explain. Let's walk through a typical optimization problem. That way you can appreciate the complexity of the problem – and see why traditional systems have trouble keeping up.

To begin, you should note that workforce-scheduling systems calculate job assignments in two distinct phases – job matching and optimization. The **job-matching** phase is the easy part of the problem. It's here where you're comparing your technician list against a set of rules. The rules are the hard-and-fast requirements of the job at hand. For instance, you may have a rule that says, "Don't assign anyone to a DSL repair job unless that person has been certified for DSL troubleshooting."

Fine. That's a simple decision to make. If Frank's not certified for DSL, you can safely eliminate him from the pool of techs you assign to DSL jobs. In similar fashion, you purge other names from your list, such as techs who don't have the required parts in their trucks, those who are more than 75 miles away from the job, and techs who are tied up doing higher priority work.

So what have we done in this job-matching phase? We've gone down a list of rules and eliminated people who can't be assigned. Now this is straightforward "yes" or "no" decision making. It requires no elaborate calculating, so any traditional scheduling system can perform this task without too much of a problem. But it's in the second phase – the optimization phase – where the troubles begin because it's here where you're no longer dealing with simple rules, but constraints.

So what are constraints? Well, quite simply, they're all the things you want to optimize. And that includes things such as reducing travel time, lowering labor costs, balancing workloads, and cutting mileage costs. Unfortunately, when you enter the world of constraints, simple "yes" or "no" answers no longer work. With constraints, your answer is never black or white: it always "depends on such-and-such" conditions.

In fact, the only way a scheduling system can mathematically handle constraints is to first prioritize those constraints – weighing the importance of one constraint versus another, then matching technicians through a scoring process.

For example, say you have five technicians qualified for a DSL field installation. "Qualified" means they have the right skills, are available, and meet any other "must-have" criteria. Now if "reducing travel times" is the most important factor on your constraints list, then the system whittles the technician pool down to the three who are closest to the job site. If the next most important constraint is "lowering labor costs," then you select the one technician out of the remaining three who's worked the least number of hours this month. This is how a scheduling system optimizes through a process of scoring and top-down elimination.

The Scalability to Execute True Optimization

So that's the theory behind optimization. And if theory was the only thing we had to worry about, then we'd have no problem. But as we'll see, the problem with traditional scheduling systems is that they can't easily put optimization theory into practice.

Think for a moment about the complexity of the field service challenge.

In today's telecom world, you can't wait for an overnight batch process to compute decisions – you need answers in real time. If you want your call center reps to do on-the-spot scheduling, then your system needs to deliver decisions within 4 seconds or less – because the customer is waiting on the other end of the line.

And if you consider scheduling decisions in four seconds to be a tough requirement, remember that the number of options that must be evaluated for each scheduling decision has factorial growth. In other words, there are 6 possible schedules for 3 jobs and 3 engineers, while there are 720 possible schedules for 6 jobs and 6 engineers, and there are 3,682,800 possible schedules for 10 jobs and 10 engineers. Optimizing the schedule for an organization with 100's or 1000's of engineers is far beyond the capability of simplistic scheduling products even those claiming to offer 'some' optimization.

But hold on, there's more. Every optimized decision requires you to do an elaborate scoring calculation – to sift through constraints such as overtime, travel time, mileage – and dozens of others. Now, we know that simple job matching will quickly purge most of those 7,000 field technicians from the job pool. But even still, if only 15 technicians are left in the optimization hopper for scoring, that's still a mind-boggling number of combinations to compute – something like 1.3 trillion. And that's for only one job!

By now you can sense the problem: How can a traditional scheduling system keep up with a computational load like that?

The answer is, it can't. Without highly sophisticated algorithms filtering through all the possible combinations, you simply can't do real-time optimization. In short, it's a scalability issue. Traditional solutions fail to optimize because they *can't scale high enough* to solve the problem.

So the next time a workforce-scheduling software vendor tells you its system delivers "optimized" decisions, ask for a look under the hood. You want to make sure nobody's cheating on the math.

Global Versus Local Optimization

Another problem with the traditional scheduling approach is that it doesn't deliver a "globally" optimized solution. For example, say you have two geographic regions, A and B, that share a border. And let's also assume that Region A suddenly gets a high-priority job along its border with Region B and doesn't have anyone available to dispatch. Since this is a high-priority job, can Region A borrow a technician from Region B's pool to do the job?

Unfortunately not. In most cases, because the dispatchers are using tools that enforce rigid boundaries, the dispatcher can't "see" across territorial or departmental boundaries. Seems kind of silly doesn't it? Of course, the dispatchers could make a few phone calls to coordinate, but were it up to the system alone, you'd be stuck with a nearsighted and less-than-optimal decision – not to mention that this procedure becomes time consuming to do on a regular basis.

It's as if you're playing blackjack in Las Vegas and you're only looking at your own hand. If you're not watching the dealer's hand or counting the number of aces dealt, it's just a matter of time before all your chips disappear. Do you see the point? The traditional solution treats everything as a local problem only – decisions are made within individual "islands of automation." And this system *rigidity* is costing you a lot of money.

The 17th century philosopher John Donne expressed the problem well:

"No man [or decision] is an island, entire of itself; every man is a piece of the continent, a part of the main."

In other words, isolated decision making won't do. Unless your decisions are made in the context of larger organizational goals and global objectives, you can't really call them "optimal."

Hiring a "Beautiful Mind" to Manage Your Field Service Operation

Consider optimization as a more **holistic approach** to decision making. It recognizes that one star exerts a small but significant gravitational pull on every other star in the galaxy. Let's go back to our blackjack analogy.

You can think of optimization as the "rain man" – the Dustin Hoffman character who made a killing at blackjack by counting cards. Except this time the Rain Man is on steroids. He's a supersavant who's simultaneously playing 1,000 blackjack games

against one dealer – and that dealer is drawing from a massive 5,200-card deck.

Now if this super rain man could watch 1,000 hands at once and count every card that's played, sooner or later he's going to own Caesars Palace. To be honest, true optimization would never work unless there's a savant under the hood.

Just think of the sheer size of the problem that optimization solves. Before optimization software makes a single decision, it must simultaneously measure the impact of that decision on thousands of resources – and against their combined cost to your business goals. And don't forget, it performs that calculation in a matter of seconds.

"Yes, but how does it do the calculation?" you ask.

From a computing standpoint, it gangs up on the problem from several directions at once – using complex algorithms. But if you need to know more than that, you'll have to ask the experts. This is deep science here for those with "beautiful minds," such as John Nash and Albert Einstein. If the math was easy to understand, any simple solution would work, and it wouldn't be as valuable as it is.

How Optimization Software Benefits Your Organization

So that's the explanation about what optimization is, why it's a superior solution, and why it's a quantum leap above the current breed of workforce scheduling and spreadsheet tools. Let's now look at how optimization can directly benefit you and your organization.

Real-time Scheduling - For a Business in Constant Change

During the day, lots of unpredictable things happen that affect your schedule. Some technicians are caught in traffic. Others are late completing calls. In other cases, the customer's not there to open the facility. Just because your schedule looked optimal this morning doesn't mean it's optimal for the afternoon. In fact, halfway through your workday, you're often operating with a schedule that's totally out of whack with today's new reality and priorities.

With a service optimization solution, however, you're no longer stuck with a bad schedule. When your system can make

scheduling decisions in a matter of seconds, there's no need to adhere to a rigid schedule. If changing the schedule will benefit your business, then the change is made. So you're now scheduling in real time – constantly optimizing your schedule as the day progresses and maintaining the lowest cost as well as the highest level of customer satisfaction possible.

And in the process, you're taking away much of the grunt work your schedulers needed to do to keep the schedule current. As a result, your schedulers are freed up to manage more technicians than they could before.

Squeezing Out Maximum Operating Efficiency

Another advantage of an optimized field service system is that you can better synchronize the work of engineers setting up a service and the field techs who install that same service. For example, if your engineers can configure only 50 customers a day, you don't want to have 150 technicians standing around waiting to install those services. And recognize this: two, three, or more jobs may need to be scheduled with specific time and technician dependencies. So this is complex stuff. And you can't expect to compute a solution like that without the aid of some complex algorithms.

In a word, you now have end-to-end visibility into the process. Your system is finding bottlenecks and making appropriate changes to your schedules accordingly, squeezing additional minutes, and hours, out of the same workforce.

Another example: You can gang together several work orders that require access to the same central office, or are in the same remote location. In short, you're getting the best use of a technician's time – balancing the load, reducing drive times, and saving big money in the process.

Achieving "One-and-Done" Customer Care

A few years ago, AT&T Wireless was losing tens of millions of dollars a year in its trouble desk operation ... but it wasn't sure why. When it hired a consultant to sift through two million AT&T trouble calls, the company soon found the culprit.

Because its **agents lacked good scheduling and problem diagnostic tools**, it was forcing them to make repeated "status-update" phone calls to customers. In fact, the research showed that for every call that couldn't be resolved on the spot, AT&T

needed to make an additional 1.6 calls to close out the problem.

Of course, AT&T's dilemma is the same one faced by service providers everywhere: how to achieve "one-and-done" customer care – resolving as many customer inquiries as possible on the first call. And it's yet another place where optimization delivers value.

First, advanced diagnostics within your optimization tool can instantly sort through hundreds of potential questions to find the **three best questions** to ask with the highest likelihood of resolving the issue. And that's precisely the information your call center needs in order to squash needless truck rolls.

Second, if a truck roll is required, your customer service agent no longer has to wait minutes for your system to calculate an appointment window – or be forced to make an arbitrary, imprecise appointment to save time.

Now, in less than five seconds, you can supply an **optimized appointment** – an appointment that satisfies the customer's needs, **is in line with your own business goals, and leaves flexibility for further schedule optimization on the day of service.**

Turning Your Field Service Operation on a Dime

As shown, optimization delivers value in a number of ways – optimized appointments, real-time scheduling, one-and-done customer care, and clearing field service bottlenecks. It has also been shown that optimization delivers efficiency. Optimization software can merge all your resource constraints – technician availability, skill sets, distance from the job, and dozens of other factors – and come up with the lowest cost solution. When you add all these things up, it makes a powerful case for investing in an optimization solution.

The optimization story wouldn't be complete without one more benefit that has not yet been mentioned but is extremely important.

The Importance of Business Flexibility

Ask yourself the following questions: Ten years ago, who forecasted the rise and fall of the dot coms? Who predicted the seven regional Bells and GTE would collapse into three companies, or that DSL and cable modem service would take off? Who predicted that Web-based cellular phones would be the rage?

Today's telecom business is all about change. Only the flexible companies will survive – those that can quickly and flexibly respond to market demands, and get there before the competition. This relentless need to adapt to current business conditions is why customer service managers continually ask themselves, "How can I make my field service organization responsive to new requirements and achieve my customer service goals?"

The field service organization is an awfully big mountain to move. And to be honest, by the time your new strategic plan trickles down to the technician level, it's usually either "too late" or "not enough."

But flexible optimization changes all that. With an optimization engine behind the scenes, you no longer need to worry about whether your customer service goals are being communicated to your field service team. Rather than set a single global field service strategy, you can now localize priorities for different regions. For instance, if you're launching a CLEC operation in a new territory, you may want to give a higher level of service there. Conversely, in markets where you're already the leader, you may want to lower the bar a bit so you can reduce costs. And if your business goals change tomorrow, no problem. Just change the optimization parameters, and your priorities switch to respond to a new competitive threat.

Quietly and automatically, your field service team is responding to your new priorities and direction. It's adapting to the demands of the business. It's helping you capture revenue streams before the competition ... and all because you've got "Einstein" on the payroll.

The Workforce and Service Optimization Solutions of ClickSoftware

An answer to the service optimization challenge is offered by ClickSoftware, the market leader in workforce and service optimization solutions. The company delivers solutions like those just described to customers such as Allstream (formerly AT&T Canada), Bell Canada, Deutsche Telekom, Telekom Austria, Telstra, and Vodafone.

ClickSoftware's founder and CEO, Dr. Moshe BenBassat, PhD, formed the company to commercialize and further develop algorithms he and his colleagues developed initially for the

scheduling of military training exercises. The focus on optimizing field service stems from providing optimization solutions to various industries, each with varying requirements.

While ClickSoftware's optimization solutions serve many field service markets, telecommunications customers represent the largest segment of the company's

business and are the perfect fit for its service optimization solution. It's the area where ClickSoftware has the greatest number of service optimization success stories. One customer uses ClickSoftware solutions to optimize the planning and scheduling of more than 7,000 technicians across multiple time zones.

Companies seek ClickSoftware solutions because it has a proven track record of helping organizations quickly reduce operating costs and increase field service productivity. The solutions even integrate with GIS information to pick optimal routes and provide turn-by-turn travel directions for technicians on the road.

Companies are often able to cost justify ClickSoftware solutions by merely trimming their operating budgets a small percentage – resulting in millions in cost savings and increased competitiveness. Because the solutions cut down on repeat technician visits, lower mileage costs, and save on scheduling labor, customers can usually recover their software investment in far less than a year. In many cases, customers gain efficiencies by eliminating 45 minutes of technician downtime – or by squeezing in one extra call per day.

Implementing a ClickSoftware Solution Is Relatively Painless

ClickSoftware realizes that implementing mission-critical, enterprise applications in a large organization can be frustrating. But the ServiceOptimization Suite is not a stand-alone system; it's designed to live with the systems you already own. ClickSoftware solutions sit comfortably on top of your current OSS, trouble-ticket, customer-care, or CRM systems. That means you don't need to rip out anything, and integration using the latest proven technologies is a snap. To the user, it's completely transparent. He or she simply clicks a button on your CRM system that says, "Book Appointment" and a background process calls up the appropriate ClickSoftware module.

ClickSoftware also works well with all of the leading CRM, ERP, and SMS providers, many of which are ClickSoftware partners. Off-the-shelf adapters enable easy integration with PeopleSoft, SAP, and Siebel systems. Furthermore, consulting firms, including Accenture, Cap Gemini, IBM, LogicaCMG, and Siemens PTD often deploy solutions that include ClickSoftware products.

For more information on how ClickSoftware can help your company with workforce and service optimization, please contact your local sales office, e-mail sales@clicksoftware.com, or visit www.clicksoftware.com.



About ClickSoftware

ClickSoftware is the leading provider of mobile workforce management and service optimization solutions that create business value for service operations through higher levels of productivity, customer satisfaction and cost effectiveness. Combining educational, implementation and support services with best practices and its industry-leading solutions, ClickSoftware drives service decision making across all levels of the organization. From proactive customer demand forecasting and capacity planning to real-time decision making, incorporating scheduling, mobility and location-based services, ClickSoftware helps service organizations get the most out of their resources. With over 100 customers across a variety of industries and geographies, and strong partnerships with leading platform and system integration partners - ClickSoftware is uniquely positioned to deliver superb business performance to any organization. The company is headquartered in Burlington, Mass. and Israel, with offices in Europe, and Asia Pacific.

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