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ClickSoftware is the leading global provider of mobile workforce management and service optimization solutions.

What we do: We maximize the productive use of human resources, asset uptime, and customer satisfaction with end-to-end enterprise workforce service optimization, mobilized for every role

Facts:

- ✔ We coined the term 'service chain optimization' back in 1996
- ✔ We received patent number US 6,985,872 B2 for continuous planning and scheduling (service chain optimization)
- ✔ We have invested over 500-person years in developing our industry-leading products
- ✔ Over half a million mobile workers are managed by ClickSoftware solutions every day
- ✔ We are the only mobile workforce management vendor to have an enterprise mobility solution that can be deployed independently of scheduling

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Service Chain Optimization

FOR

DUMMIES®

By ClickSoftware



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Introduction



Welcome to *Service Chain Optimization For Dummies*, and the heart of field service management. This minibook is your guide to understanding why and how you can embark on the optimization journey so that your service business can increase workforce productivity, improve customer satisfaction and reduce your operating costs.

About This Book

This minibook gives you an introduction to the phenomenon called *service chain optimization* that's transforming the way service businesses work out in the field. This minibook is for you if your business is in an industry that employs a mobile workforce such as utilities, telecommunications, IT, office equipment, insurance, retail, healthcare, home services, or the public sector. We share techniques that are used in all sizes of world-leading service businesses.

Foolish Assumptions

In writing this minibook, we've made some assumptions about you:

- ✔ You're an operations manager or service executive who faces the daily dilemma of delivering excellent and reliable customer service while balancing your customers' demands and expectations against your operating costs. Maybe you're feeling the pressure

of delivering an ever-improving level of customer service while managing shrinking annual operating budgets.

- ✔ You're a service organization's customer who wants to read a business-targeted book to see what technology exists today that will enable you to receive a better level of service in the future. You don't like waiting at home for hours just because the best level of service you're offered is an all-day appointment.
- ✔ You understand that different industries refer to their mobile workforce and their work in different ways – engineers, inspectors, technicians, surveyors, crews, gangs, shared vehicles and so on. We keep things simple by referring to these workforces as a 'mobile worker' and the work they do as a 'job'.
- ✔ You don't mind reading a book that uses American English rather than Anglicized terminology so seeing the occasional letter 'z' rather than 's' really doesn't bother you.

If you fit into any of the above, read on!

How This Book Is Organized

Service Chain Optimization For Dummies is divided into four small but highly informative parts:

- ✔ **Part I: Getting to Know Service Chain Optimization.** We start by explaining what service chain optimization is all about and why it's so important.

- ✓ **Part II: Achieving Excellence on the Day of Service.** Next, we look at the fundamentals behind delivering service today, looking at optimized scheduling of mobile workers, appointment booking, routing and mobile communication.
- ✓ **Part III: Looking Beyond the Day of Service.** Here we explain the importance of forecasting customer demand and planning mobile worker levels. And when the day is done and your customers are happy, what lessons can you learn to make the future even brighter?
- ✓ **Part IV: Top Ten Tips for Building an Optimized Service Chain.** This final part provides sound advice on making your service chain optimization journey a success.

Icons Used in This Book

This minibook is packed with useful information. To make it easier for you to spot the most important points, just look for the following icons.



The Dummies man indicates real-life anecdotes and examples to illustrate points and inspire you to act.



The knotted string highlights important information to bear in mind.



Aim for the target for tips that enable you to be successful in optimizing your service chain.



The bomb signals some of the common and general mistakes that you can avoid.

Where to Go from Here

As with all *For Dummies* books, you can either be traditional and read this minibook from cover to cover or flick straight to the section that interests you the most. Whether you read in small doses using the section headings or all in one go, you'll find plenty of information to get you on your way to service chain optimization.

If you'd like more information about service chain optimization, just contact ClickSoftware's friendly team at: www.clicksoftware.com/solutions-contact-us.htm

Part I

Getting to Know Service Chain Optimization

.....

In This Part

- Understanding the concept and challenges
 - Defining your service policies
-

Let's get straight to the point. Service chain optimization is all about putting the right mobile workers in the right places at the right times to deliver great service to your customers while keeping costs down. It's that simple!

In this part we introduce you to this subject and talk about business improvement and how you can keep your customers happy.

Defining Service Chain Optimization

Every service business is ultimately measured by its performance on the day of service and ensuring that you have the right mobile workers in the right places at the right times is critical. Your ability to deliver service

on the day it's required is the last link in a chain of decisions that were made weeks or months before the day of service. The service chain is therefore a decision-making process consisting of several interrelated steps, or links, which all affect the day of service but that use the information that was available to you much earlier. Miss any of these steps, and your ability to deliver service can suffer. Throughout this minibook you'll encounter every link in this service decision-making chain.



Don't worry too much about the word 'optimization'. We're not going to distract you by talking about mathematics or science. Instead we're going to talk about business improvement and how you can keep your customers happy! In the context of the service chain, optimization is all about getting the most productivity from your mobile workers at the lowest cost, while sticking to the goals of your service business.

Before getting into the details of service chain optimization, consider supply chain optimization, which everyone, as consumers, tends to take for granted. This is about getting the right product in the right place at the right time.

Supply chain optimization concentrates on having the right inventory (stock) available to meet expected demand. For example, each time you enter a store to buy any product, you're the last step of an entire supply chain optimization process. Previous planning, decisions, and optimization affected that product's availability and stocking level. If the store gets this wrong, there are negative implications:

- ✓ **Overestimating the demand leads to having too much stock.** This is expensive, leads to excess waste and affects profitability.
- ✓ **Underestimating the demand leads to having too little stock.** This creates longer delivery times, and you risk losing your customers to more efficient competitors.



Optimizing the supply chain therefore requires the store to find the optimal balance between satisfying customer demand, maintaining product availability, minimizing delivery lead-times, maximizing customer satisfaction and reducing costs. To deliver effective customer service, the store needs to stock the right level of inventory, at the right place and at the right time to meet customer demand. This helps to maximize customer satisfaction. Technology, and particularly smart software (intelligent software that uses clever algorithms to make efficient decisions), is used in the background to help manage this difficult challenge.

You may be wondering, 'How does this supply chain challenge relate to service chain optimization?' Well, in a service business, to deliver effective customer service using mobile workers you need to employ the right number of people, with the right skills and parts, who are available in the right place and at the right time, to meet the customer demand. This is how service businesses maximize customer satisfaction. Consider:

- ✓ **Overestimating customer demand leads to too many mobile workers.** This is expensive, creates excessive idle time and affects operating costs which threaten the profitability and long-term viability of your service business.
- ✓ **Underestimating customer demand leads to too few mobile workers.** This creates longer lead times to meet with the customer, and you risk losing customers to more efficient competitors. Your customers don't want to be left waiting for too long!

The similarities between service chain optimization and the corresponding supply chain challenge are clear! With both, maximizing your profitability and customer satisfaction are extremely important. And, like manufacturers who are focused on the supply chain challenge, service businesses still operate with some inefficiencies too!



One of the big differences between supply chain optimization and service chain optimization is that the service chain deals with people and the use of their time, and not stock, or raw materials. And while both have geography to contend with, the physical movement of your mobile workers is more dynamic than the stocking of inventory. And remember that even though your customers' appointments and service levels may be unpredictable, they're all still expecting to receive the same high level of service. Nobody wants to be that forgotten customer!



But the biggest difference of all is that you can't store time like you can store stock. This concept is so important that Part II of this minibook covers it extensively. Head there to find out more!

Remembering the Power of the Customer

Service chain optimization is important for balancing mobile workers levels with costs and customer satisfaction. And the customer plays a vital role in this because the world has changed dramatically over the past few decades. Customers now have more voice, choice and flexibility than ever before, and higher expectations. Service businesses must manage change to keep their customers happy because change mostly favors the customer!



Here are a few examples of how the power in customer relationships has transferred to the customer:

- ✓ **Ease of switching.** Deregulation in some industries has increased competition and customer choice. In the communications industry for example, if the customer doesn't like their package or the service they're receiving, they're usually free to switch to a new supplier without question. Gone are the days when the customer had no choice and was tied to just one supplier. Today's customer has much freedom when deciding on their supplier of telecommunications, mobile, broadband and cable or satellite services.

- ✓ **Scheduled appointments.** Offering appointments to customers for deliveries or repairs used to be simple – all day, morning, or afternoon appointment windows were the norm, potentially leaving the customer waiting at home for hours. Today's service businesses give customers more choice – four, two and even one hour windows are offered. Without optimization, these narrow time windows are costly and can kill the financial performance of your business. And if you're still offering long appointment windows, you can expect customers to leave you for a competitor who provides more choice and reliability. Who wants to wait in all day? Customers have better things to do!
- ✓ **Online shopping.** Purchasing products or groceries doesn't mandate a trip to the store anymore. Thanks to the Internet, an increasing amount of product is purchased online from the comfort of the customers' homes or workplaces. Because there's no personal 'in store' retail experience, the only physical interaction is made when the delivery arrives at the customer's location. Get this service experience wrong and customer satisfaction and retention take a hit.
- ✓ **Social media.** A quick search of the Internet reveals the vast number of websites that now exist for customers to vent their fury and frustrations about the service they've experienced. Negative publicity of this nature drives away current and future potential customers.

Recognizing the Challenge

Quite simply, these changing market dynamics, where the customer now holds so much power, are increasing the pressure on service businesses to provide reliable, flexible and almost faultless service to their customers. Many service businesses are guilty of providing nothing more than mere lip service to customer satisfaction and customer relationship management. Now's the time to take both of these seriously.



Focus on the customer but not at any cost!
Take this too far – for example, by employing so many mobile workers that every customer can be visited today and within an hour – and you'll quickly find that you have an unsustainable cost base.

So how do you focus on the customer but not at any cost? This is the essence of the service chain optimization challenge.

Scheduling: Where the Rubber Meets the Road

You may not realize that the efficiency and financial performance of your service business may already experience the service chain optimization challenge every day. Service chain optimization simply means managing your mobile workers in the most efficient and cost effective manner to deliver adequate levels of customer service that aid both customer satisfaction and retention.

Introducing the W-6 scheduling principle

Every scheduling decision has at least six major factors to consider before assigning a mobile worker, and this consideration needs to occur simultaneously with all other outstanding jobs. Before making a scheduling decision, ask yourself the following questions:

- ✓ **Who?** Which mobile workers are available, with the necessary skills and qualifications, the required security clearance and are within a reasonable distance of the customer? Is more than one mobile worker required?
- ✓ Does **What?** What job will the mobile worker be doing? What skills are needed? How much time should the job take?
- ✓ With **What?** What parts, tools or special equipment are required?
- ✓ **When?** At what time can the mobile workers arrive? What is the service level agreement or appointment window? What is the customer's availability?
- ✓ **Where?** Where is the location of the job? Is there a street address? Are there any geographic challenges to consider in the routing decision?
- ✓ For **Whom?** Who is the customer and do they have special preferences or a special status?

Written succinctly, you're deciding, 'Who, does What, with What, When, Where, and for Whom?', coined as W-6 by Professor Moshe BenBassat (founder of ClickSoftware) over two decades ago.



Full service chain optimization requires you to do more than just schedule your mobile workers, so keep on reading!

The challenge arises from the complexity of finding the best overall mobile worker to attend to each job, every time and every day. That's not just the closest mobile worker, or the one who can necessarily respond the fastest, but the one who best balances the workload, minimizes costs, is skilled and has the parts available to complete the job at the first attempt.

Scheduling gets even more difficult because you don't schedule jobs in isolation; you need to consider the next job, and the next one and so on to find the most efficient schedule possible. You have to look at the whole day. The decisions you make in scheduling a mobile worker directly and often irreversibly influence what follows. Scheduling is like a game of chess; once you've committed a mobile worker to a job, the future scheduling possibilities are altered so you must look ahead to avoid compromising your position and options.



The optimized scheduling and mobile dispatch of your mobile workers plays the most critical role in service chain optimization and produces the quickest and most reliable return on your investment. Scheduling or mobility are great places to start, as both directly impact the bottom line. Even better, doing both at once can instantly transform you into a real time service organization.

Approaching the Challenge

Service businesses take many approaches in trying to overcome the service chain optimization challenge. These approaches fall into three categories – compromise, automate or optimize.

Compromise

Many service businesses have traditionally made compromises to enable easier decision-making. A simple but common example is the creation of invisible boundaries of coverage which are established solely to make manual scheduling more manageable. This means that any new job that arises within a territory is assigned to one of the mobile workers who look after that particular territory.

Establishing these invisible boundaries is a compromise that reduces the number of possible choices and the complexity of the decisions made by people – that's your dispatch team.

Compromise is the lowest level of evolution for a service business trying to cope with the the service chain optimization challenge. Spreadsheets, white-boards, and simple scheduling applications are often used to support this working practice.



While compromising may appear to be simple, it comes at a cost. Compromise is inefficient because it disregards the overall workload balance, and doesn't allow for the scheduling of a closer and more appropriate mobile worker from a neighboring territory. The common result is one mobile worker being over-utilized and a comparable mobile worker in another territory sitting idle. The over-utilized mobile

worker could accumulate additional overtime costs whereas the under-utilized mobile worker is doing nothing while still being paid by you! Ultimately, this harms all aspects of your service delivery – utilization, efficiency, productivity and response times. And your customers won't be happy either because it'll take you too long to get to them!



The more you fragment your mobile workers into territories and business lines, the lower their overall utilization and productivity. This risks damaging your level of customer satisfaction because you have less flexibility when delivering service.

Automate

The next level of evolution is to automate. A simple computer program is used to automatically assign jobs to mobile workers by addressing only some of your business's considerations, for example matching skills requirements, but over-simplifying others such as minimizing travel distances by using aerial routes. Simple automation with such limited intelligence is often worse than manual decision-making itself because frequent mistakes by the computer will make an experienced dispatch team question all of its other decisions! This causes them to manually intervene and eventually stop using the system altogether. When you let computers make your decisions, you ordinarily expect them to be the right decisions, but to achieve this you need 'optimization'.

Automation does bring some benefits with small improvements in utilization, efficiency, productivity and response times. Clearly this is an improvement

over the Compromise approach but service chain optimization still hasn't been achieved.

Optimize

Optimization utilizes advanced and sophisticated computer algorithms to dissect the service chain problem and solve it in the most efficient and intelligent way (this is where smart software plays its role in service chain optimization). For most, service chain optimization is the best option so make it your target. This approach balances customer satisfaction and operating costs. Utilization, efficiency, productivity and response times are all maximized and everything is consistently aligned with your business strategies. Any conflicts between competing goals are resolved according to your defined Service Policy (which is covered in the next section 'Introducing the Service Policy').



Don't be scared by computer algorithms – you should never have to see them! The algorithms are powerful mathematical techniques working behind the scenes that are designed to solve complex problems quickly and efficiently. They're written by mathematicians and almost always outperform humans. Not only do they create the best starting point but they constantly review and revise the day's plan to maintain highly optimized schedules in an ever-changing day.



If you want to solve the service chain optimization challenge, just imagine the cost savings available to you if you could triple the number of mobile workers managed by each member of your dispatch team. This alone may enable you to pay for clever algorithm-based software

that doesn't require hiring and doesn't present employee turnover – the software won't stand up and leave you!

Having said that, don't think you have to make your current dispatch team redundant. Read Part II to find out why.



Scheduling isn't just about placing magnetic tiles on a white board – it's about solving the challenge by placing them most effectively and in the most compact manner to maximize utilization and the customer experience. Optimization creates the significant value and benefits for your service business.

Introducing the Service Policy

Conflicting forces pull your service chain optimization decisions in opposing directions. Does the following conflict sound familiar to you?

- ✓ **The Vice President of Service** wants to keep customers happy and maximize satisfaction.
- ✓ **The Chief Financial Officer** wants to reduce operating costs and improve profitability.
- ✓ **The Business Development Director** wants to increase market share and to penetrate new markets.
- ✓ **Employees** want to work reasonable hours and not be overloaded with overtime or excessive travel.
- ✓ **The Regulator** expects you to meet the minimum requirements for operating in their industry.

Ultimately the key is to define what your business's policy is for prioritizing jobs. The *service policy* is your written definition of the scheduling criteria for your business which is then configured inside the service chain optimization solution. It embodies the goals of your business, taking into account that different stakeholders have different goals.



Most service businesses have different operating divisions with separate optimization requirements. It's usual for multiple, non-conflicting service policies to exist in a business.



Whatever factors suit your service policy, remember that achieving one goal can come at the expense of achieving another. For example, a goal to reduce costs can significantly impact the goal of maintaining high service levels and customer retention. You need to understand how best to prioritize, and determine which goals you can't compromise.

There's no right or wrong service policy, just the one that best suits your business. The policy communicates to your dispatch team and the optimization algorithms what they need to achieve, and the rules and objectives for getting there.



Computers may seem clever but their intelligence is artificial! All they do is practice your service policy in an optimal and consistent way, on a speed and scale that no human can match! The result is a significant improvement in the business metrics that you decided to focus on.



Taking the opportunity to rethink

Defining your service policy gives you an opportunity to rethink how you run your business. Don't just try to reproduce today's results and performance. Think about where you want to be in the future: achieving service excellence.

Trying to reproduce manual working practices inside optimization software is risky and can lead to implementation and acceptance challenges. Follow our tips in Part IV for best working practices.

Embracing Holistic Service Chain Optimization

The service chain is bigger than just optimized scheduling. Even the best optimization algorithms can hit an early limit if the rest of the chain is ignored. If your workload is, say, 150 percent of your capacity for an extended period of time then no level of optimization can overcome this reality. You need to plan ahead to employ enough mobile workers to meet your customers' demands!



Continuous improvement, the last part of the chain described in the nearby sidebar, is essential because service chain optimization is a journey, not a destination. How you operate this year may not be the same next year so you need to keep up!

The full service chain has power and synergy. The benefit to your business from implementing each part of the chain individually is smaller than the combined benefit of having a well-gearred, full chain. This happens because of the natural flow of information between each link in the chain which improves your ability to make great decisions.



All parts of the chain provide benefits but most service businesses tend to start by focusing on their most immediate pain – the daily scheduling challenge. Once this pain is removed, their focus tends to move onto the other links in the chain.

We cover the service chain in a little more detail in Part III.

Following the service chain

The service chain contains several links that you need to consider and optimally manage. Ask yourself:

Planning

- ✓ **Forecasting.** How busy will my service business be next month, quarter, or years ahead? What marketing or business initiatives are likely to produce more (or less) demand?
- ✓ **Planning.** If I have a forecast workload for the future, then how many mobile workers do I need, with what skills, and where? Do I need more mobile workers, fewer mobile workers, or to consider using subcontractors to meet this demand?

- ✓ **Rostering.** I now know how many mobile workers I need, but what shift patterns and working hours should I use to provide coverage to my customers? What is the best policy and process for building my rosters for any shift, for weeks and months into the future?

Executing

- ✓ **Scheduling (the W-6 optimization challenge).** Who, does What, with What, When, Where, and for Whom?
- ✓ **Mobility.** How can I best communicate the schedule and job details to the mobile workers, receive updates, notify customer cancellations, and continually optimize my schedule in response to all changes?
- ✓ **Location based services.** How can I best use location data from a GPS system to continually optimize my schedule and divert the right mobile workers to an emergency job?
- ✓ **Customer contact and follow up.** How can we enable customers to book appointments via the web and send/receive notifications of job status changes and progress?

Reviewing

- ✓ **Analytics.** How did we do? Did we meet the goals of our service policy? Where can we improve? Who are our best and worst performers and why?

Feedback

- ✓ **Continuous improvement.** How can I ensure I receive feedback on business performance to help refine future forecasts, plans and service policies?

Part II

Achieving Excellence on the Day of Service

In This Part

- ▶ Understanding the importance of time
- ▶ Creating and managing optimized schedules
- ▶ Keeping everyone in the loop

The *day of service* is where everything happens: mobile workers are scheduled to their jobs, most appointments will be honored but some may be missed, customers will cancel, traffic will delay progress, new emergency jobs will appear, some jobs may take more (or less) time than expected, mobile workers may phone in sick, and many more things can happen that affect your schedule and how your service business performs that day.



We use the word ‘mobile worker’ to refer to any type of mobile field worker including engineer, technician, inspector, surveyor, gang, crew, shared vehicle and so on, and ‘job’ to refer to any type of work that they do.

The day of service is therefore of prime importance. Or is it? While a great amount of variation and unpredictability

occurs during the day of service requiring real-time management, interestingly, your success is also governed by what happens in the lead-up to the day. That is, your success is derived from what happens before the day of service, and not just on the day.



Have your mobile workers track how much time they spend each day:

- ✓ Completing paperwork
- ✓ Talking on the phone with your office or customers
- ✓ Making adjustments to their schedule.

You'll be surprised by just how much time is wasted on these unproductive activities! Service chain optimization isn't just about improving decision-making. It's also about producing operational efficiencies by reducing paperwork and voice communications between your dispatch team and mobile workers, and reducing the overall number of changes in the schedule.

Presenting the Real-Time Service Enterprise: It's All About Time!

Organizations who are involved in manufacturing products have to optimize their supply chain where the primary resources include machines and the commodity of raw materials. Many of these materials can be stored on the shelf until the day they're required. If you happen to have too many materials, the excess can often be sold on to recover some of your investment.



Watching time melt away

Say your service business employs 1,000 mobile workers who are each available to you for 8 hours per day for servicing customers. This gives you a total capacity of 8,000 hours and at a rate of \$50 per hour, you're managing a daily operating cost of \$400,000.

As soon as the day begins, the clock starts ticking and those hours and minutes of capacity start melting away. For every minute that a mobile worker is productive and tending to a job, value is created.

But every minute a mobile worker sits idle or spends traveling is unproductive time with no value being created.

At the end of the day, all 8,000 hours have vanished and your success is governed by how productive your mobile workers were during that time. You can't reutilize unproductive time nor save any idle time to use tomorrow. That time has gone forever. Ensure your dispatch team knows how much of your money they're managing and controlling each day and encourage them to use their time wisely.

In the service world, the commodity is no longer raw materials but time. That's *people's time*, and how you use it.



You can't store time – use it or lose it!



The key to successful service chain optimization lies in the efficient use of time and how your service business responds to changes during the day.

One of the usual business benefits that service businesses seek from service chain optimization is an increase in the productivity of their mobile workers. For example, this could be increasing the number of jobs successfully completed each day from four to five per mobile worker, a modest 25 percent productivity gain. This is certainly one of the most transparent measurements of success in many, but not all, service businesses.

Service chain optimization around the day of service helps to achieve this goal by creating and managing an optimized schedule outlining which job will be assigned, to which mobile worker, when . . . sound familiar? This is the W-6 challenge from Part II! Who, does What, with What, When, Where, and for Whom? First, you begin by creating an optimized schedule...

Creating Optimized Schedules

The jobs that are scheduled for today didn't all appear this morning or at the same time. Some jobs are installations for new customers and they may have appeared last week. Others are maintenance jobs which you knew about quite some time ago. And then there are the repair jobs that arrived yesterday or possibly even today! So the initial schedule is formed several days before the day of service but in a way that gives you freedom and flexibility to reshuffle as new jobs appear. This reshuffling makes further improvements in skills matching, response times, and travel reductions. It's all aimed at maximizing the quality of your schedule and squeezing the most productivity from your mobile workers.

In the optimized world, shuffling and reshuffling to seek an optimal schedule is way beyond the capabilities of the human brain, even for just a small group of mobile workers. But how does the computer know what is good for your business and the rules by which you schedule? This is the role of the service policy that we talked about in Part I.

Service Policy to the rescue

The service policy directs the service chain optimization algorithms so that the algorithms know what's allowed, what's not, and the overall business aims of its optimization processes. And the service policy seeks to resolve any conflicting pressures. The primary factors involved in the service policy (and there are others) are:

- ✓ Business rules
- ✓ Business objectives

Business Rules

The *business rules* direct the service policy so it understands what decisions are allowed to be made in your service business. The rules provide the boundaries of the optimization. Automated and optimized decisions must comply with these rules – they must be fulfilled.



Business rules can be straightforward or highly complicated; they can allow for degrees of flexibility, or be written specifically to suit your unique service business. Many business rules are standard and are used across different businesses, and across different industries. Here are just a few examples of business rules:

- ✓ **Skills.** Only assign a mobile worker who has the necessary skills and qualifications for the job.

- ✓ **Travel.** Place a maximum distance that a mobile worker can travel from home or between jobs.
- ✓ **Time.** Honor the service level agreement or appointment time. If the mobile worker can't get there in time, automatically assign an alternative.
- ✓ **Available.** Only assign mobile workers that are available and working while considering their commitments such as a doctor's appointment or vacation.
- ✓ **Parts and Equipment.** Only assign a mobile worker who has the necessary parts and equipment available, or who can collect these while en-route.
- ✓ **Phasing.** Assign jobs that have multiple stages in the correct order so that they follow the right sequential path.



TIP Don't expect perfection every time! There'll always be times when you can't schedule a job because of unavoidable rule violations. For example, you may simply have nobody available with the right skills! Remember to include any common decisions in your service policy.



REMEMBER The role of your dispatch team is now changing because of service chain optimization! Instead of building a full schedule, now they have time to focus on the more challenging exceptions – those jobs that can't be scheduled automatically according to your standard policy.

The set of 'must' and 'must not' rules determine the legitimacy of potential schedules. Optimization is the process of finding the best schedule from the

legitimate options. But you can't find the best schedule from business rules alone. Welcome to business objectives...

Business Objectives

Working alongside the business rules are the *business objectives* that define the aims of your service business and the often conflicting goals with their relative levels of importance. This is where the algorithms become really smart in achieving optimization. They create the best schedule to meet your requirements by considering the business rules and objectives simultaneously, while also finding a balance between conflicting business goals.

Optimizing using business objectives is all about finding the balance. You could certainly reduce response times by having more idle mobile workers waiting for the next job to appear or by making mobile workers drive further. But both of these options have negative implications by decreasing utilization or raising travel distances. It's your service business so only you know what's best for you and your customers. Your service policy's business rules and objectives need to express this balance.



Service chain optimization algorithms lack interpersonal skills, emotions, sensitivity and humor. This is where your dispatchers can really shine! In times of crisis, ensure your dispatchers are still helpful and friendly to make a great impression on your customers.



Don't let optimization algorithms control all of your decision-making – people still have a vital role! Get help from your dispatch team in defining your service policy. Doing so helps to reduce any resistance later on.



Delving deeper into business objectives

Business objectives are common across many service businesses and work types; they're just given different importance. Here's a sample of the more common business objectives:

- ✓ **Travel.** Minimize the total travel across the entire schedule by reducing travel from home and between jobs.
- ✓ **Response Times.** Minimize your overall response times to customers (or to certain types of customer) by arriving onsite faster.
- ✓ **Overtime.** Minimize the use of expensive mobile worker overtime which services customers late in the day.
- ✓ **Priorities.** Try to assign higher priority jobs first (although you can assign a lower priority job en-route as long as you still meet response time commitments for both).
- ✓ **Finances.** Create the optimal schedule in terms of costs and revenues. Maximize revenue, but minimize costs!

Booking Appointments Dynamically

Appointment booking is the process of agreeing to a service window with a customer, usually several days before the day of service. Everyone's experienced the

morning, afternoon or all day window and the frustrating wait at home that this brings. Most manual processes, and even many service scheduling applications, offer customers appointments based on a number of pre-determined slots for a geographic area, product type or time window. These slots are arbitrarily allotted to customers as they call, until they're all filled. It's a simple first-come, first-served approach.

However, this approach ignores important factors such as the location of previous jobs, or the true availability of individual mobile workers and their skills. This leads to problems with efficiency, effectiveness and utilization which is against the whole concept of service chain optimization!



Imagine two customers living on the same street who select appointments on the same day but for many hours apart. The time and distance incurred from the excess travel damages the performance of your service business.

If you have appointment slots that don't consider the varying durations of different types of work, you end up with increases in late arrivals and mobile worker idle time. These slots aren't based on the exact circumstances of the customer who's on the phone now!

When appointment booking is optimized, service businesses identify the criteria that are important to them through their service policy. This may be providing the shortest route between jobs, while still offering a time that's convenient to the customer and that also maximizes mobile worker efficiency. Appointment optimization considers the existing workload versus mobile worker capacity in terms of geography, skills and time.

Appointment optimization avoids any predefined estimates (which are usually inaccurate travel and labor time ‘averages’ that are based on past experiences and not on what’s really happening now).

Appointment optimization is dynamic, with the schedules re-optimized throughout the day creating further improvements in mobile worker utilization while maintaining customer commitments and service levels. So, as mobile worker availability changes (customers cancel appointments, or new ones appear), the dynamic optimization ensures that appointments are offered and delivered in the most efficient way possible.



The success of your business on the day of service is born at this point, many days earlier. You’re planning ahead.



Customers can often be just as pleased with a time that’s the most cost-efficient for you (but don’t tell them!) as long as your commitment is reliable. You can always offer higher cost options if asked, and sometimes at a premium for convenience.



Reality: TV

A national supplier of satellite TV services in the United Kingdom has improved its level of customer service through using service chain optimization. Previously offering the traditional morning or afternoon choices, their business is transformed by now providing appointments with shorter lead times and with greatly reduced appointment windows.

Reaching Your Destination with Street-Level Routing

Travel optimization plays a vital role in creating the optimized schedule. Whether this is appointment booking, automatic assignment, rescheduling, emergency jobs taking immediate priority, or anything else, travel optimization is involved in every decision.

When was the last time that you drove to a friend's house in a straight line? Probably never but, surprisingly, some approaches to scheduling consider travel times using a straight line ('as the crow flies') between jobs based on postal codes or on pre-defined travel times between service areas. While this approach may seem acceptable, the benefit is superficial because it ignores vital details that adversely affect mobile worker arrival times. Just imagine the disastrous effects on planned travel times from ignoring bridges, one-way streets, rivers and other obstacles that get in the way of your mobile workers and your customers.



Linear travel estimations cause excessive travel costs and harm customer satisfaction because your mobile workers can arrive late or, worse still, not at all. Your customer is disappointed. And it takes just one deviation from the planned travel time for a chain reaction to begin.



People drive on roads, not in the air! Street-level routing takes into account obstacles such as rivers, lakes, mountains, bridges, one-way streets and speed limits, giving a more

accurate estimation of travel time. This ensures that you can make commitments to your customers that you can keep. And that's why street-level routing is part of the dynamic appointment booking process.

Service chain optimization prevents avoidable routing mistakes from occurring. By using detailed data from Geographic Information Systems, all of these geographic obstacles are known, meaning that your customers receive reliable appointment windows.



If you're not using street-level routing, you're wasting mobile worker efficiency and pushing up your operating costs. Letting your mobile workers determine their routes is very costly because you're paying a field mobile worker's labor rate to do the job of one of your dispatch team!



Optimize across the entire workforce and not one route at a time. Street-level routing isn't just about which mobile worker should travel from Job A to Job B – the key productivity improvement is about deciding who to assign to Job B given everything else in the schedule and not just the job before. Travel time must be part of the scheduling decision and considered in parallel with, not before or after, all other scheduling criteria.

Keeping Up to Date

At the start of the day of service, your schedule is optimized. It's a masterpiece. Before you stands a predictable day of service perfection. Right? Well, sadly, no.

What you have is an optimized and most efficient starting point only. The very moment the day begins, the schedule can change and if you don't keep on top of the changes the day can quickly unravel. All of the benefits for your business disappear. The reason for this unpredictability is because service delivery involves humans – and sometimes we're not the most predictable and reliable species!

The day of service is full of surprises, and not always nice ones! Here are just a few examples of why keeping the schedule up-to-date is so important:

- ✔ **Cancellations.** Customers sometimes cancel because their problem is solved, or because they have other commitments. If the cancellation enters the schedule quickly and the mobile worker is notified then you can prevent unnecessary travel and utilize the mobile worker on another job instead.
- ✔ **Problems.** Scheduling means you need to estimate the duration of the job but sometimes this takes longer – a stuck component, inefficient mobile worker or difficult working conditions can all contribute so your one hour job takes two hours instead. If you don't re-optimize the schedule then appointments at the end of the day will be missed – resulting in unhappy customers!
- ✔ **Sickness.** Mobile workers call in sick or perhaps fall ill during the day. Re-optimize the schedule to re-allocate the work to maximize the number of jobs the other mobile workers can complete.
- ✔ **Accidents and delays.** The geographic nature of field work means that traffic delays due to road

works or accidents are inevitable – these may result in a temporary delay or remove the mobile worker completely. Again, re-optimization manages the impact. Real-time tracking using location-based services (such as GPS) can have a mobile worker rerouted to a clearer route to save time.

- ✓ **No one home.** The perennial problem – the mobile worker arrives on time but the customer isn't in, resulting in lost time, lost productivity and the need to revisit on another day.

All of these changes need quick attention. Delays in reacting, no matter how short, lose valuable productivity and efficiency. Real-time tracking is so-called for a reason – the change occurs, and the schedule is immediately re-optimized to gain the maximum benefit. Delays are a waste of everyone's time.



For the unprepared business, unpredictability leads to missed appointments, idle time, increased costs and panic!



Take a breather. Recognize that achieving total predictability in field service is impossible. Focus your efforts on being proactive and better managing the unpredictability.

Measuring Performance

All service businesses measure their performance using key metrics such as mobile worker utilization, jobs completed per day, first time completion rate and response times. But reporting yesterday's performance is too late. Vital decisions that could have been made earlier to turn around the performance are gone. You missed the opportunity.



Reaping the business benefits

Can service chain optimization really improve business performance so much? Yes! Here's a small sample of real life examples. After implementing service chain optimization:

- ✓ A UK water utility increased service level performance by 33 percent, reduced overtime by 11 percent and reduced average travel per job by 24 percent.
- ✓ A US maintainer of cash machines and security equipment reduced total travel by 300,000 miles per year and increased mobile worker productivity by 33 percent.
- ✓ A US gas utility reduced overtime by 22 percent, increased revenues by 18 percent and now offers two-hour appointment windows.

Service chain optimization monitors the metrics in real-time giving you time to respond and to take corrective action to improve today's performance. If one area has too much work and response times are suffering then mobile workers can be temporarily relocated to alleviate the pain. Real-time reporting enables real-time decisions to be quickly made.

Keeping the Lines of Communication Open

An important part of keeping the schedule up to date is communication, not only with your mobile workers, but also with your customers.

Communicating with mobile workers

Mobile communications technology has made the benefits of service chain optimization even easier to achieve. Gone are the days of telephone calls to mobile workers advising them of the schedule, and of any changes. And gone are the days when paper job sheets were used. Today's optimized service business is digital, passing all job information to mobile devices instantly. The communication travels in both directions. Mobile workers have the ability to provide status updates and close jobs in real time. Customers can give electronic signatures, mobile workers can issue receipts and rearrange appointments - all using their mobile device. Mobile technology enables auto-time capture, upsell capabilities, field collaboration, and more; all the tools necessary to deliver a superior customer experience!



By integrating real-time field data with optimized scheduling, you can gain tremendous improvements in mobile worker productivity and customer responsiveness. Intelligent optimization can reduce the time taken to reschedule an entire day from hours to just seconds.

All data from field devices is analyzed by the optimization processes as they come in, so highly optimized decisions are generated in real-time.



Gaining the maximum return on investment from service chain optimization means that mobile communication is essential. When you make your mobile choice, think ten steps ahead. Keep in mind that your needs will change; perhaps your CIO's strategic direction

is to have a single mobile solution across departments, or you may want to have multiple devices and mobile operating systems depending on the user. With HTML5 your contractors can even use your mobile solution because it's web-enabled.



Mobile data, not speech, is the most efficient way of communicating. It may sound impersonal but if you're still using paper, or voice, then you're losing time.

Communicating with customers

Consuming customers' time is one of the problems of service delivery. To receive service the customer usually needs to be present. But time consumption is one of the most critical metrics for customer satisfaction, so minimizing it is of top importance. Customers don't want to be left waiting for one minute more than necessary!

You've been there – waiting at home for your appointment and then, towards the end of the day, you receive the dreaded call saying that the service business can't get to you today. How frustrating is that? Couldn't you have been told much earlier in the day, when the problem became clear? Fortunately, you can minimize this pain by using service chain optimization.



The convergence of technology means that the customer doesn't need to wait in all day. Today's optimized service business sends text messages with expected arrival times during the day. If customers want an update, they can go online and check the website. Or they can log in for an update using their mobile phone's

browser. Service chain optimization means regular and timely communication with the customer; and it's all automated too!

By automatically updating customers on the expected arrival time of your mobile worker, you can provide a commitment time that's wide enough to maximize the efficiency of your service business. And this still minimizes the amount of time that the customers must be available because they know when you're due!



The real-time service enterprise involves updating the schedule, re-optimizing, managing the changes, communicating with mobile workers and communicating with customers. Miss one of these and you're not operating in real-time. You're damaging your business benefits and not achieving service excellence.



Mobility can be a powerful entry point to mobile workforce optimization because of the visibility and real time communication between mobile workers and the back office. The solution can be easily enhanced with pre-packaged, pre-integrated business apps.

Part III

Looking Beyond the Day of Service

In This Part

- ▶ Decision-making in the service chain
 - ▶ Contrasting planning and scheduling
 - ▶ Knowing the role of business analytics
-

Customers naturally assume that problems occurring during the day of service come from poor scheduling or from the service business responding too slowly to changes. But have you planned the right level of capacity? That is, do you have enough mobile workers working and available to deliver the right level of service? Poor operational decisions of this nature immediately impair your daily performance and could have been avoided through better planning. The short-term corrective options available to you are limited, costly and sometimes painful. For example, you can use overtime, subcontract your services, relocate mobile workers, cancel training or cancel vacations but none of these are attractive. Capacity-related decisions need to be made long before the day of service. Travel back in time with us in this part to discover how decisions made long ago impact the day of service.

Service Chain Decision-Making

The total mobile worker capacity available to you on the day of service is the result of a sequence of decisions made long ago. The further ahead of the day of service that you make your decisions, more choice and less costly options are available to you.

The service chain decision-making process consists of several activities. Working backwards through time before the day of service, you have:

- ✔ **Rostering.** The shift patterns are calculated and the shifts are staffed several weeks, or even months, ahead of the day of service. You know how many mobile workers are working for what hours on which shift pattern. Shift patterns may not change frequently but the mobile workers on each shift do. You have to ensure you have enough mobile workers working on each shift to deliver the expected level of service to your customers.
- ✔ **Tactical planning.** Before planning the shifts for given dates, you need to ensure that your mobile workers are available to work (don't consider them when they're on vacation or training). Here, you're making minor adjustments to cover any gaps; for example, adjusting the level of subcontractor usage, or approved overtime to accommodate recent updates in the expected workload.
- ✔ **Capacity planning.** But long before tactical planning, you need to determine the size and the mix of skills in each territory or service area to ensure you have enough mobile workers and skills to meet the expected level of demand, service levels

and your plans. You also need to consider other options that your business may have that could affect service delivery such as the launch of a new product or service to customers. At this stage, you have sufficient time to make decisions that change your capacity such as hiring, training, contracting or even making redundancies if business is declining.

- ✓ **Demand forecasting.** For all of these activities to happen, you need to start at the beginning with your demand forecast answering the important questions about how busy you'll be in the future, taking into account historical trends, seasonality, cycles and new business initiatives.



Without a forecast, everything else in the service chain decision-making process is a guess. You need to have a reasonable prediction of future demand so you can accurately plan your mobile workers and address any gaps.

Relax a little. Don't aim for 100 percent accuracy. Instead, recognize that the process of planning ahead is of greater value than any plan itself because service is so unpredictable.



Service chain decision-making isn't restricted to mobile workforces. Static organizations such as call centers, retail stores and hospitals also benefit from service chain optimization.

The beauty of service chain optimization is that activities are completely integrated. Changes to the forecast automatically adjust the capacity plan and rosters.

Changes to the capacity plan alter mobile worker availability in the schedule. Independent manual processes miss this opportunity, with your business processes quickly becoming disconnected.



Ignore any of the service chain decision-making steps at your peril! Your success on the day of service starts here, long before the day itself.

Distinguishing Between Planning and Scheduling

Time for a little math quiz. Say your service business employs 200 mobile workers who each complete 4 jobs per day. So your daily capacity is 800 jobs. But recent growth in your business has your average daily demand running up at 1,000 jobs. You place several requests to recruit more mobile workers but these are refused. So you have a shortfall of around 200 jobs per day. Even the best and most sophisticated optimized scheduling can't fully resolve a gap of this size.

This is a matter of mobile worker *planning* and not mobile worker *scheduling* – you simply have an insufficient capacity. Consider:

- ✔ In **scheduling**, you're matching real jobs to specific times and mobile workers. It's the day of service, and more jobs may appear today. You're working out how best to achieve the day's service objectives.
- ✔ With **planning**, you're matching mobile worker levels against a forecast workload with varying degrees of certainty but these mobile worker level decisions will later affect your scheduling.

Let's contrast these a little more. In scheduling, your total mobile worker capacity is a given, and you use this to deliver daily service to meet the demand. But if the demand is higher than your capacity then you have a problem that is resolved somewhat using limited options. You may use overtime, contractors, or reluctantly push some customer jobs to tomorrow. But in planning, you're seeking to establish your total mobile worker capacity in terms of how many mobile workers you will need, with what skills, located where, and over what time periods? And then there's shift planning – which is also known as rostering – where you're planning the mobile workers against defined shift patterns.



Forecasting, planning and rostering are all about thinking ahead. Scheduling is all about executing and delivering real service before and on the day of service. While the results of scheduling decisions may be more visible, the outcomes of planning decisions usually impact more jobs and mobile workers. Planning decisions play a bigger part in the bottom-line performance of your service business – financial profitability.

Staying in Control with Business Analytics

Monitoring the performance of your service business during the day of service is very important so you can keep on top of the day, react to any changes and still meet your targets. Monitoring is a tactical use of performance data. And not less important is your historic performance and how you can use it in further optimizing the future performance of your service business.

Measuring your service policy

Most service businesses monitor their key performance indicators using a variety of metrics – for example, jobs completed per day, utilization, travel time per job, labor time per job, first-time completion rate and re-visit rate.

To make good operational use of your measurements, present them by time, geography, business line, product or any other way that suits your business. You get the most benefit from analytics by giving each person the metrics that are relevant to them.



Your key performance indicators must measure the performance of your business in accordance with your service policies, otherwise you won't know if your performance is effective and if your service policies are correct. Measuring your performance is the role of business analytics!



Inspect the service performance reports carefully and look for patterns. For example, the average number of jobs completed per day per mobile worker is interesting, but so is the maximum and minimum. Check which mobile workers complete the smallest number per day, and don't jump to conclusions. Maybe they work in a rural area where the travel distances between jobs are high, which reduces the number of jobs they can complete each day. Maybe demand for their skills has dropped. Or maybe they're your best mobile workers, who you assign to the toughest and longest jobs, so you need to look for ways to get others to learn from them. Drilling down and understanding relationships in this

manner uncovers many ways of improving your overall service performance.

Influencing your forecast

Historic performance and demand data is the service chain's feedback loop that helps to produce initial future forecasts, but this is based on the premise that history will repeat itself. And as we all know, this is not necessarily the reality, so the forecast must be adjusted to reflect deviations from historic patterns and trends.

Consider the implications of average travel times rising in your business. If the reported performance data is now the norm then you must adjust your forecast to reflect this otherwise your total mobile worker capacity for labor time is already unrealistic and overstated. This is because your mobile workers are now spending more time traveling and less time 'working'. You're planning to fail if you don't make good use of this data!



Analytics is the end of service chain optimization but it's also the beginning of the next chain. Use your data to further optimize your business.

Even if you think you have a perfect model now, changes in the market, changes in your business, and even changes in the weather can require an adjustment to your service policy.



Keep challenging the way you do things. Keep looking for ways to improve delivering service to your customers. Keep aiming to achieve service excellence!

Part IV

Top Ten Tips for Building an Optimized Service Chain

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Implementing service chain optimization may seem a bit daunting but follow these top ten tips for a productive journey.

- ✓ **Change the way you run your business.** Although service chain optimization is driven by smart technology it does more than just automate today's manual processes. To get the most out of your investment, rethink and change the way you operate internally.
- ✓ **Invest in mobility that will work for the whole company.** Your mobile workers need to know about their schedule, and you both need to communicate changes from the initial plan. Forgetting to invest in mobility could greatly reduce your expected return on investment.
- ✓ **Involve your workforce early in the project.** Implementation is all about change and some mobile workers may object because 'I've been working like this for twenty years so why bother?' Get people involved early so they can see the benefits and support your project.

- ✓ **Regularly review your service policies.** Over time your business strategy and priorities change so you need to update your service policies to reflect this. Just because your service policies suit you on day one doesn't mean they're always correct. The best run service businesses keep on top of their service policies.
- ✓ **Think green!** An unexpected benefit of service chain optimization is that it's kind to the environment. Mobile workers travel less and spend less time idling in traffic which helps to reduce your service business's carbon footprint.
- ✓ **Choose your measurements carefully.** The Key Performance Indicators that you measure and the goals that you set drive the behavior of your entire service business. For example, if you only measure the number of jobs that are completed each day, you may find that too many are followed by a repeat visit to the same location the very next day!
- ✓ **Think beyond mobile workers.** Service chain optimization also suits service businesses where the customer comes to you, such as retail stores, hospitals, airports and call centers.
- ✓ **Don't think your business is too small.** Service chain optimization solutions are for everyone. Check out ClickSoftware's software-as-a-service product clickexpress.clicksoftware.com if you don't have hundreds of mobile workers to optimize.
- ✓ **Contact ClickSoftware to find out more.** Despite being a riveting read, this book just gives you a

glimpse into the possibilities. ClickSoftware coined the term 'service chain optimization' in 1996 and was awarded a patent for many of its methods and principles. Discover more about service chain optimization by contacting ClickSoftware.

- ✔ **Keep up to date with the latest news and discussions.** Subscribe to Clickipedia, the blog that focuses on service chain optimization, at clickipedia.clicksoftware.com. Follow ClickSoftware on Twitter at twitter.com/clicksoftware, Facebook at facebook.com/clicksoftware, and YouTube at youtube.com/clicksoftware. For a blog with a mobile perspective, try mobilefever.clicksoftware.com, or check out available mobile business apps in the ClickAppStore at <http://appstore.clicksoftware.com/>



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“Finally - a truly comprehensive guide to service chain terminology, processes and success metrics.

There is also emphasis on the hottest topics leading the service chain into the future, such as social media, mobile devices, GPS integration and even green considerations. This book is a must read for new service managers.”

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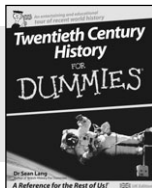
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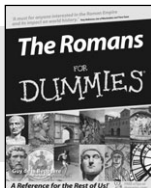
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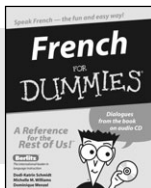


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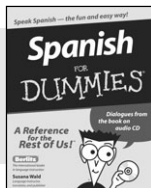


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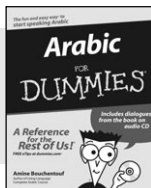
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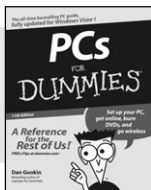


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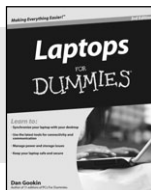


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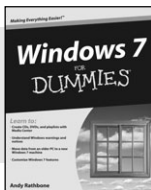
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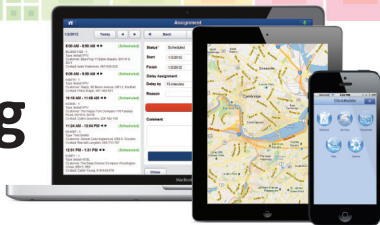
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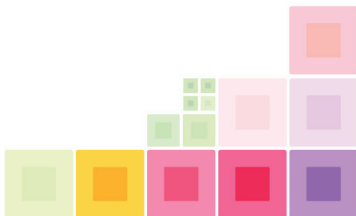
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