Jul. 15, 2003 Issue of CIO Magazine

PROJECT MANAGEMENT

How IT Fixed London's Traffic Woes

In a nation known for spectacular IT failures, a new traffic reduction scheme has gained global attention for its smashing success. The secret? Strong project management applied to well-designed systems.

BY MALCOLM WHEATLEY

Read the Executive Summary of this article

IN 1903, 10 years before Henry Ford began mass-producing automobiles, traffic traveled through central London at a sedate 12 mph, with horses providing most of the motive power. One hundred years of progress later, the average speed had slowed—yes, that's right, slowed—to just 9 mph. As in other major cities, traffic congestion has negated a century of determined innovation of the internal combustion engine. Figures showed that London's drivers spent around half their time in queues, incurring 2.3 minutes of delay for every kilometer they traveled.

But on Feb. 17, 2003, London began to fight back. The British capital launched an anticongestion scheme, based on tolls, that is attracting attention from all over the world. Unlike American-style tolls, though, there's no sitting in queues waiting to pay. Or transponders.

Instead, 688 cameras at 203 sites scattered across the 8-square-mile anticongestion area photograph the license plates of the 250,000 cars that traverse it each day. Enter the anticongestion area marked by a red C logo painted on signs and streets. Get photographed. And get ready for a one-off charge payable for that day, irrespective of how long the vehicle is in the zone, or how many times it is photographed. At a data center in central London, Automatic Number Plate Recognition technology is then applied to convert the photograph images to license numbers. Motorists who don't pay the toll that day are fined about $130, automatically. (See "London Traffic Scheme: How It Works," right).

London Traffic Scheme How It Works

Winston drives his Astin Martin into the charging zone. A camera takes a photograph of his sedan's license plate....

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Now, London's traffic scheme is high profile. The mayors

Vital Stats

Congestion zone is **8 square miles** in central London

688 cameras at **203 locations** to record license plates

174 entrances and **exit points** to and from the zone

Drivers are charged when they enter the zone weekdays between **7 a.m.** and **6:30 p.m.**

of New York City, Paris and Tokyo are all said to be watching with interest. The reason? Fines and tolls combine to give the project a payback period of about a year and a half, and should in total generate an eye-popping $2.2 billion in 10 years—all of which is earmarked for spending to improve London's public transportation systems. Best of all, according to a report cited in *The Independent* newspaper in March, traffic in the city's center had fallen by 20 percent, improving journey times by 5 percent. Transport for London, the U.K. capital's transit authority, won't report on the scheme's effects until

August; but officials say they expect delays caused by congestion to fall by 20 percent to 30 percent, saving drivers 2 million to 3 million hours of frustration every year. And on present form, the authority seems set for a pleasant surprise: It had been expecting traffic to fall by only 10 percent or 15 percent.

In the British public sector, IT projects often fall flat on their faces. (See **"Her Majesty's Flying IT Circus,"** which catalogues failure on a scale nothing short of heroic.) And, as these words are written, Britain's tax authorities are defending yet another botched computer-laden initiative—a new tax credit system developed for Britain's Inland Revenued department that has seen millions of working parents receive late payments, causing in some cases severe hardship.

And the omens for London's congestion charging scheme weren't auspicious: a tight implementation timetable, no preexisting model anywhere in the world to follow, the challenge of integrating new technologies—plus a brand-new transit authority working under a brand-new mayor. The inevitable question: In an area littered with IT disasters, why should this one work? The answer: an intriguing blend of clever procurement, vigorous project management, careful design—coupled with savvy and determined political leadership. (See "Why It All Worked," right.)

Why It All Worked

An expert identifies the reasons for the traffic project's success

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If *The West Wing* ever has a traffic congestion charging plotline, expect it to look a little like what you're about to read....

An Uncharted Road

From the outset, the risks were obvious. Quite simply, nothing like this had been attempted in a capital city before. Nor did London's streets lend themselves to the toll-charging proposal, explains consultant Derek

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Turner, former head of street management at Transport for London. Cramped, narrow, convoluted and literally hundreds of years old, they would require cameras to be sited very carefully in order to achieve sufficiently high levels of number recognition accuracy.

The Man Behind the Plan

London's first elected mayor made traffic congestion his main priority

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Not only that, but the city's leadership was new, part of a process to have London voters directly elect their mayor for the first time in 2000. This led to the ascension of Mayor Ken Livingstone (see "The Man Behind the Plan," right). Coincidentally, Transport for London, the government agency established to upgrade the metropolitan area's public transit systems, also was new and untested, staffed by people drawn from a clutch of predecessor organizations with different policies, practices and cultures.

Of course, various anticongestion schemes had been discussed and mooted over the years. Livingstone was determined that his tenure would see action, rather than yet more talk. A 1998 independent government white paper previously had highlighted two options—a clampdown on workplace parking and a camera-based toll system. Deeming the parking clampdown to be a political bombshell, Livingstone told Transport for London to get on with the camera-based system. The deadline for delivery: Feb. 17, 2003, one year before the next mayoral election.

For Livingstone, the political risk was huge. He could expect any failure to be viciously seized upon.

That was the bad news. But there were some positives too. Undeniably, the scheme was positive with the public. If Livingstone could pull it off, another election victory seemed assured. And why would a toll system prove popular? Quite simply, most people wouldn't be required to pay it. Although 1 million people entered central London by all forms of transport every morning, 85 percent of them did so by public transport. A minority (motorists) would pay to improve the lot of the vast majority.

And there were ways of minimizing the political risks. In retrospect, one of the smartest moves of the whole project was a decision by Transport for London to recognize its own limitations—limitations in terms of experience, IT ability and management time. (Officials such as Turner, don't forget, were very busy. His days were filled with bringing the capital's streets under a single management for the first time.)

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Time to Outsource

Accordingly, explains Malcolm Murray-Clark, one of the two directors appointed by Turner to oversee the scheme, Transport for London made the decision to outsource critical elements of the project management of the scheme—first to consultants from PricewaterhouseCoopers, and second to consultancy Deloitte & Touche.

Very early on in the project, then, project managers identified the critical technical elements of the scheme and made judgments about the costs and risks of acquiring these as part of a big-bang solution or instead going for a best-of-breed approach. U.K. public-sector IT projects have often favored the big-bang approach: The congestion charging scheme went the other way. Managers divided the project into "packages" that could, if required, be bought and managed separately.

There were five such packages: the camera technology to be used; the image management store where the images would be collected, turned into license numbers and condensed (duplicates would occur when one vehicle was photographed by several cameras); the telecommunications links between the cameras and the image store; the customer services infrastructure, including the ability to pay by phone, Web and mail; and finally, an extensive network of retail outlets, enabling people to pay at shops, kiosks and gas stations.

And even at this early stage, the policy of risk aversion was having an effect. Murray-Clark says one option would have been to lump the customer services infrastructure and the retail side together in a single customer-facing operation. Instead, retail was seen as a big enough challenge to be bought and managed separately. Likewise, the mere existence of the five packages underpinned a determination to go for best-of-breed in each instance—in every case, the package had to be the best available.

Putting Contractors Through Their Paces

Shortly after London's 2001 New Year celebrations had ended, Transport for London began inviting tenders for the five packages. The $116.2 million in IT-related contracts made the project large enough to require listing in the European Union's public-sector register, and tenders were open to companies throughout Europe. Again, the consultant-designed procurement strategy came into play: The camera and

communications packages could be bid for separately, while the remaining three could receive bids on a combined basis, or individually. "Ideally, we wanted a single provider, but were retaining the ability to mix and match," says Murray-Clark.

While selecting the camera and communications packages was straightforward, the remaining three packages—the bulk of the IT work—proved more problematic. A long-listing process, managed by Deloitte & Touche, brought the original 40 or so bids down to four. "We went through a couple of months talking to all four, and then reduced the bidders to two," says Murray-Clark.

At this point, the procurement strategy dictated another move that in retrospect seems astute. "We told the two bidders that before we could make a decision, we wanted them to undertake a technical design study," he explains. Taking three months, this step would firm up the technical issues underpinning the contracts—issues such as data throughput, how the retail channels would work, how to achieve the best number recognition performance, and what payments might be expected through each payment channel.

From the perspective of the procurement strategy, explains Murray-Clark, the clever thing about the technical design stage was that it added a lot of value without actually holding anything up. "We were moving ahead but still using the competitive element of the bidding process to get the best solution," he says. The move wasn't without cost—the two bidders were each paid for the work—but the theory was that the cost of paying the losing bidder for doing the work would be more than outweighed by the benefits of using its work to improve the overall quality of the project.

And it was this phase of the project that highlighted the fact that from the technical point of view, the greatest challenge was going to be the creation and management of the image store. It had to process a million records each day (picture those 250,000 vehicles moving about the city center all day)—as well as store them for evidentiary purposes for the subsequent prosecution of nonpayers. Meeting the challenge meant carefully evaluating design considerations (such as using the most reliable technology available) and writing software code that would automatically detect which image of a passing vehicle would yield the most accurate number recognition.

From the perspective of The Capita Group, the winning bidder that emerged in December 2001, the process was a confidence booster. "The experience of the

technical design study was actually quite a useful one because it created confidence in both us and Transport for London about how the scheme would work, and how long it would take," recalls Simon Pilling, executive director at Capita, who was in charge of the project. "The deadlines were very tight and were politically driven, and it highlighted where the risks were."

Some of those risks were outside Capita's control, of course. (London officials were anticipating some kind of legal challenge to the scheme, and the city beat back a challenge from the Westminster district arguing that it would unfairly impact them.) But for the rest of it, the company was on the firing line. The contract included, explains Murray-Clark, "a very robust set of liquidated damages against the contractor for failure to deliver against the timescale. We set out the [market] stall, they agreed that that was what they would produce, we agreed to the milestones for getting there, and we agreed on the consequences of not getting there."

There was one additional ingredient: third-party oversight for the main contractor. Despite assigning people who as Pilling puts it "had spent a large part of their working lives on large government projects," Transport for London required that Capita agreed on project management methodologies with the consultants from Deloitte & Touche *before* work could commence. "They were the advising consultant, and their job was to report on how it was being performed," explains Pilling.

Getting It Done

The project plan showed that some 300 years of effort would be required—effort that would have to be done in little over a year, if the project was to go live as planned. From the outset, Transport for London, advised by Deloitte, was determined that milestones would be rigorously monitored. "We had a statement of requirements that said, 'This will happen at this point in the process—now demonstrate it,'" says Murray-Clark. "We'd decided early on that testing wasn't something that could be skimped—as problems were identified, they were ranked in order of priority, and fixed."

Capita had bid for three packages (image management, customer payments and the links to retailers), and it won them all. Transport for London, however, preferred to deal with one prime contractor, and so it awarded the company the task of managing the camera and communications parts of the project as well.

Far from complicating the task, selecting one company probably made it easier: Capita had decided at the

outset that all the people working on the project—Capita personnel and subcontractors—would be physically located together in a single building in Coventry, in central England. "If you want a project to work well, it makes sense to bring all your team together—putting everybody together cuts out a lot of bureaucracy, time wasted through traveling, and means that the only videoconferencing we were doing was with the client, back in London," observes Pilling.

The views of the subcontractors are hard to elicit. Essentially, Transport for London has banned them from speaking publicly about the charging scheme, a decision that insiders say is unlikely to ever be reversed. "It was a contractual decision that we made early on in the process," says Murray-Clark. "This was an extremely newsworthy project, and we needed to speak clearly and with a single voice."

But the subtext is also clear. Prime Minister Tony Blair has shown a mastery of public relations far ahead of his opponents. Livingstone wanted his administration controlling the spin on this project.

Delivery

As the days after Feb. 17 showed, the news was of course good. In fact, it's hard to find a negative aspect to report—with the sole exception that because so many drivers have been deterred from entering central London, revenue may be below expectations. But for a project with the primary objective of reducing traffic rather than raising revenue, that hardly counts as a major failure.

Why did it work out so well? In addition to the attention paid to procurement and project management, Murray-Clark and Pilling point to a few other factors. First, scope creep was vigorously guarded against—with one of the few add-ons, in fact, being the option for motorists to pay tolls through the popular SMS text messaging format. Second, Capita's deliverables were spread out over a manageable timescale, rather than concentrated toward the project's end. And third, notes Turner: "It simply wouldn't have happened without a strong political leadership and will."

Finally, adds Murray-Clark, "The trick was to not use any new technology—all the technology was proven. What had never been done before was to integrate it—and to do it on time and on budget." CIO

Freelance writer Malcolm Wheatley is based in Devon,

England.

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Traffic has been reduced by the congestion charges but the constant fiddling with traffic lights(pedestrian priority) and schemes such as Trafalger Square pedestrianisation will soon annul any benefits

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Dear sir,

I will appreciate it if you can provide me with a complete copy of the Dublin UTC Traffic Management System (SCATS) Project Profile or any of the other available UTC based Project Profiles and information.

My office is on the verge of understudying the emergence of a traffic control project in Nigeria and in a short time to come we will be appointing foreign partner to work with us as consultants/Partner on the project.

i will appreciate it if you can provide my office with this details which is hoped will guide us in selecting you as a likely consultant/Partner on the project.

Information about my company NETWORK INFORMATION TECHNOLOGY NIGERIA LTD can be viewed on our website at www.nitnigeria.com.

I look forward to hearing from you.

Thank you.

Ismail Olayemi O.
Senior Manager- Strategic Planning & Operations
Network Information Technology (Nigeria) Ltd
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One of the recent UK fiascos was a £623 million ($1 billion) Air Traffic Control System, which came on line in mid-2002. The Display screens identified Aircraft (height / direction) in a font size that was too small to read, and then when it was increased to be legible, the data for adjacent aircraft overlaid each other, causing some near misses. Font size is not a feature to be considered a whim of the User - it is a fundamental ergonomic of the User Interface which any self-respecting developer should be able to have an informed opinion on. IBM & Lockheed Martin built the Air Traffic Control system. Other famous fiascos include the Passport system from Siemens & the Social Security system from Accenture & the Inland Revenue Tax systems from EDS.

Keith Appleyard
IT Architect & Taxpayer
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The system isn't covering its costs because car traffic volumes are down 30% (they anticipated only 10%) - so successful it may have to be decommissioned!

Keith Appleyard

Email
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In terms of public relations and acheiving the stated primary goal the system has worked - Road congestion has dropped in the central zone with little increase in traffic in the streets that surround the zone. Bus transportation has been improved, though it was the tube which took the brunt of the increased commuter traffic and will take longer to improve. Yes, there have been a number of complaints of incorrect invoices but these are a small percentage of the total but have been seized on by critics as been evidence that the system has failed. Transponders would have been nice but would have increased the complexity of the system dramatically (as well as the cameras to catch people without transponders you need stations to detect the transponders and you have the hassle of getting the transponders installed in all of the vehicles which might use the system). The system has worked.

dave
IT Manager, London
Print comment

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