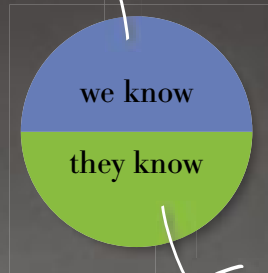


TOP TO BOTTOM



END TO END

## Stockholm gets moving with a Selected Business Solution from IBM and SAP

### Overview

#### ■ The Challenge

*With many islands and bridges, and few access roads, Stockholm's transport network was struggling to deal with traffic at peak hours. As the necessary expansion of the road network will take a long time, the existing road network had to be used in the most effective way possible. The government decided to implement a trial of congestion charges in Stockholm, from 3 January to 31 July 2006. The Swedish Road Administration is responsible for the trial and the congestion charging, the main objectives of which are to reduce congestion, improve access and mobility and contribute to a more sustainable environment.*

#### ■ The Solution

*The Swedish Road Administration chose the Selected Business Solution for Road Congestion Charging from IBM – an end-to-end solution designed, implemented, managed and supported by IBM using best-of-breed technologies including SAP software, running on the IBM System p platform.*

#### ■ The Benefits

*Peak traffic volumes reduced by 20 to 25 per cent; queuing times reduced by 30 to 50 per cent; less noise pollution and lower carbon emissions; complete business solution provides congestion charging system on an outsourced, SLA model.*

#### ■ Key Solution Components

*Industry: Government  
Applications: SAP® R/3® Enterprise, mySAP™ Customer Relationship Management, SAP NetWeaver® BI, IBM Selected Business Solution for Road Congestion Charging  
Hardware: IBM System p™ servers (model 690), IBM BladeCenter® systems with HS20 blades powered by Intel® Xeon® EM64T processors, IBM System x™ servers  
Software: IBM AIX®, IBM DB2® optimized for SAP solutions, IBM WebSphere® Application Server, IBM Domino®, IBM Tivoli® Directory Server, IBM Tivoli Storage Manager, IBM Tivoli Workload Scheduler  
Services: IBM Global Business Services, IBM Laboratories (Rochester), IBM Business Partner Arbor Solutions*

The Swedish Road Administration is responsible for the country's entire state road transport system – some 100,000 km of roads and ferry routes, and around 15,000 bridges. The Administration employs over 6,600 people and spends more than 20 billion Swedish kronor (over €2 billion) per year on maintenance, improvements and constructions.

One of the Administration's key responsibilities is the transport network for Stockholm, a city composed of numerous islands linked by bridges, with relatively few access roads and only one bypass. As 760,000 people live in the central parts of the city, and hundreds of thousands more commute in every day from the surrounding area, it was becoming difficult for the road and rail networks to cope with the volume of traffic – particularly as neither has enough capacity to act as a fail-over for the other when there is a problem.

In the long term, the best solution is to build more roads and bridges and expand the rail network – and there are large projects already underway to



*“The IBM hardware provides a reliable, high-performance platform for the SAP software and other systems”*

Birger Höök  
Project Executive  
Swedish Road Administration

achieve this. However, Stockholm needed an interim solution to reduce congestion quickly, helping the city get to work on time and financing the necessary improvements.

#### **Selected Business Solutions**

The government planned to pilot a congestion-charging scheme in the city, and decided in late May 2004 that the Swedish Road Administration should be responsible for the implementation of a solution which would automatically tax every Swedish registered vehicle going in and out of Stockholm city centre between the hours of 6.30 and 18.30 on week days. The Administration considered a number of options before choosing to finalize the procurement and select IBM Svenska AB for the Congestion Charging Scheme.

IBM Selected Business Solutions provide a complete answer to some of the most common technological and business problems in every industry

sector – IBM manages every aspect of the project, from design through implementation to management and support. The final design of the system was made in close cooperation with the Swedish Road Administration in order to achieve the best possible solution for the administration of the congestion tax. The vast experience of IBM Global Business Services consultants in both technical and business fields ensures that the solution will be designed using best-of-breed technology and adapted to the unique needs of the business customer.

IBM designed a solution based on SAP software running under IBM AIX on the IBM System p platform. Two p690 servers are partitioned into 20 logical partitions to handle the SAP financial and CRM applications from SAP, as well as SAP NetWeaver Business Intelligence (SAP NetWeaver BI) and various IBM DB2 databases.

Further processing power is provided by six IBM BladeCenter systems containing more than 60 IBM HS20 blade servers, powered by Intel Xeon EM64T processors, as well as 10 Intel-based IBM System x servers. These Intel platforms run WebSphere Application Server under Linux, supporting a Web portal, and Citrix under Windows, which provides desktop applications for the call centre. As Web and call centre traffic increases, it will be simple to add processing capacity, simply by increasing the number of hot-pluggable blade servers in each of the BladeCenter chassis.

“The IBM hardware provides a reliable, high-performance platform for the SAP



software and other systems,” explains Birger Höök, Project Executive at the Swedish Road Administration. “And since IBM manages the entire solution, we can be secure in the knowledge that the expertise is available to get the most out of the hardware we use.”

#### **Automated, accurate solution**

When a vehicle enters the congestion zone during the charging period, cameras photograph its front and rear licence-plates with an infra-red flash. The images are relayed from the roadside to the central system, which stores the images and processes them using optical character recognition (OCR) technology. If the image cannot be read mechanically, it is sent to a team of employees who check it manually.

When the license plate is identified, data concerning the owner of the vehicle is extracted from the National Car Registry – an IBM DB2 database – and billing information is sent to the SAP financial applications, which issue tax notices and deal with payment and fines. Drivers can settle their account by direct debit if they have a transponder installed in the vehicle, or can pay at 7-Eleven or Pressbyrå stores, at banks, or over the Internet. IBM WebSphere Application Server interfaces between the back-end SAP software and the Web portal which the stores use to communicate with the congestion charging system.

Operational information about the system is also sent to SAP NetWeaver BI, where analysts can prepare reports and help fine-tune the system to better meet the needs of the city and its people.

Since the future of the congestion charging solution depends on the public support it receives at the September referendum, the financial controlling systems need to be extremely accurate – if incorrect invoices are sent out, or the wrong people are charged, popularity will decrease rapidly.

“It is very important that the system should treat people well,” says Birger Höök. “The SAP financial software does a superb job of eliminating mistakes and keeping service levels high. We had a target that no more than five in every 100,000 invoices should be inaccurate: with the SAP software and the redundancy built into the IBM hardware and software systems, the solution is hitting and even surpassing that target.”

IBM chose SAP software as the core of the new system after evaluating a number of alternatives. Gunnar Johansson, Road Charging Business Solution Manager for IBM Global Business Services, explains: “Time and time again, SAP software has been proven capable of handling high volumes of accounting data – which is crucial for this solution. In our post-project evaluation, we also confirmed what we had expected – the reliability of the software helps keep maintenance costs comparatively low.”

Birger Höök adds: “Because we needed a solution which would work from day one, we needed to be confident that the entire system was built from proven components. The advantage of the IBM Selected Business Solution is that it ensures that all the technology is selected by

*“The IBM Selected Business Solution has performed well - delivering a complete solution in just one year and ensuring smooth running throughout the pilot period.”*

Birger Höök  
Project Executive  
Swedish Road Administration

consultants who are experts in their field. We are very happy with the choice of SAP software as the core of our solution – both SAP and IBM have the infrastructure and expertise to support large, high-profile projects like this one.”

### Keeping Stockholm moving

The solution has reduced road traffic in Stockholm by between 20 and 25 per cent, dramatically relieving congestion and resulting in a 30 to 50 per cent reduction in queuing times.

“We thought we would have to measure the results to see whether the solution made a difference to peak-time congestion, but in fact the difference is obvious even to the naked eye,” says Birger Höök. “In surveys, people often comment that the city is noticeably quieter during the morning and evening rush hours than it used to be, and most people appreciate the fact that journeys are a lot more predictable. We can now rely on a 20-minute journey actually taking 20 minutes, since the risks of getting stuck in traffic have been considerably reduced.”

Less car traffic on the road has also boosted the efficiency of the city’s bus network – so much so that the timetables have had to be redesigned to reflect the increased average speed of traffic. The charge has also encouraged a considerable increase in the number of bus passengers, helping the city achieve its eco-friendly transport objectives.

In a referendum on the issue, a majority of voters in Stockholm have declared themselves in favour of the congestion charging solution. Birger Höök attributes this attitude to the real

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and obvious benefits of the charge in keeping the city moving, as well as the high levels of accuracy and a good customer service offered by the IBM and SAP solution.

“When the solution was first implemented, most people were expecting chaos – lots of calls to our helplines, people not understanding how to pay, and the system not responding properly. In fact, the IBM Selected Business Solution has performed well – delivering a complete solution in just one year and ensuring smooth running throughout the pilot period. In addition to that we have put a lot of effort into communication with the public, with media and the City of Stockholm and the Government.”

He concludes: “The SAP applications and IBM design, project management, consultancy, software and hardware services have combined to provide Stockholm with a congestion charging system which offers genuine, noticeable benefits to the city and its inhabitants. This is a solution that could help to improve accessibility in the transport system, and might even help to finance the system’s necessary expansion in the future.”



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