



*Swissair and IBM use Pervasive Computing to smooth out Check-In Turbulence*



**Swissair**



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## Timeline

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|----------------------|---|
| <b>1997</b>          | Swissair identifies customer care as a business differentiator  |
| <b>1998/1999</b>     | Original e>track development carried out with CSC   |
| <b>Q3 1999</b>       | Swissair and IBM discuss Pervasive Computing. IBM selected as Pervasive Computing partner.  |
| <b>August 1999</b>   | Original e>track system goes on trial. Easy Check-In development starts at IBM Zurich Labs as a proof of concept for WAP. IBM selected to finish e>Track project. |
| <b>November 1999</b> | Easy Check-In POC solution delivered.   |
| <b>December 1999</b> | 150 WAP phones given to frequent fliers for WAP trials. e>track roll out approved by Swissair.  |
| <b>April 2000</b>    | e>track goes live for all Travel Club Members.  |

## Overview

Airport delays are a familiar part of life for the business traveller. What is more, the majority of time spent at airports is unproductive. In an ideal world there would be no delays but, until that time, the next best thing is to have facilities available to minimise that unproductive time. This is the approach that has been adopted by Swissair as a part of its drive to add value to the service it provides to its customers. The Swissair initiative is designed to remove some of the barriers that are placed in front of passengers as they go through the processes required to board an aircraft. This is a non-trivial task since these processes cross the organisational boundaries between airlines, airport authorities and government officials.

Swissair's solution has been to develop mobile solutions that allow its most frequent passengers to check-in for flights automatically, to pass through the airport without any delays, to collect boarding passes and also to receive messages about their flights with offers of alternatives if delays occur. At the same time, Swissair is able to keep track of where their passengers are within the airport and to send them messages to ensure that they get to flight gates with time to spare. Not only do these passengers by-pass many of the delays that are usually associated with flying but also the flights themselves are less likely to be delayed by passengers arriving late at the gates. These are revolutionary developments in customer service that rely completely on emerging advanced technologies.

Two different approaches have been taken to these solutions. There is the e>track system that uses a chip embedded within a frequent flyer club membership card. Antennae placed at strategic points within the airport can monitor the progress of these cards. Apart from knowing where each card is located, the first detection of the passenger within the airport can trigger an automatic check-in based upon known bookings. This allows the passenger to avoid the queue at the check-in desk and proceed directly to the business lounge or gate. This is a startling and very effective application of the latest in smart card technology.

The second part of the solution is a separate system, known as Easy Check-In. This Wireless Application Protocol (WAP)-based solution allows customers to check-in for flights using their mobile phones and to receive flight information using state-of-the-art wireless-based SMS (short message service) messaging. In particular, Easy Check-In will inform customers of flight changes and offer any alternative flights that may be available. This gives the customers a choice of arriving at the airport later or finding another flight.

In both cases, the solution requires a mobile customer to send and receive information in a real-time environment. This is an area that IBM addresses through its Pervasive Computing strategies and the Swissair project has been a useful proof of concept for the technology.

## Swissair Customer Care

Swissair is a mid-sized airline, operating between most of the major destinations in Europe. It has always had a reputation as a high quality airline and has developed a strong customer care culture. Today's customer care philosophy has come about as a result of initiatives that were first started back in 1997. At that time, Swissair was examining the ways in which it could market its services. It did not wish to become involved in a price war or increase its network size to become a world-wide operator. Becoming a leader in the provision of in-flight services was an option but this would be both expensive and quickly copied by competitors. The strategy that was agreed upon was to differentiate Swissair from the competition through its view of its customers.

Gerhard Romanescu is Swissair's Vice-President of customer care management. He says, "We were already strong in this area—we had the customer care culture. We decided to build on this strong foundation by taking the fundamentals that already existed and linking them." He adds, "Our philosophy is that at every point of contact, Swissair knows the customer and knows how to add value to the travel of the customer."

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## The Company

### Swissair

Part of the SAirGroup and Airline Management Partnership (with Sabena)

Based in Zurich, Switzerland and Brussels, Belgium

Income: (1998) CHF 5,263 million (Approximately US \$ 3 billion)

Fleet: 136 Aircraft

Passengers: 13.86 million

Personnel: 7,726

Providing airline services with a strong emphasis on the delivery of customer care

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## Web Sites

[www.sairgroup.com](http://www.sairgroup.com)  
– parent Web site

[www.swissair.com](http://www.swissair.com)  
– details of flights, bookings and frequent flyer facilities.

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## The Application

Customer care flight check-in applications

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## The Technology

IBM WebSphere Application Server

IBM MQSeries

IBM DB/2

Wireless Application Protocol (WAP)

IBM Netfinity Server

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## The Services

IBM Global Services  
IBM Research, Zurich

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## The Benefits

Improved customer experience through delay reductions

Customers gain up to 20 minutes per check-in

Enhanced airport processes across all organisational boundaries

System Availability > 99%

Some cost reductions expected from smaller number of complaints and fewer check-in desks

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In September 1999, Swissair entered into a partnership with Belgian airline, Sabena. This partnership provides a common management group for both operational airlines whilst also benefiting from the economies of scale that come from being a larger organisation. The customer care group works across all aspects of all businesses within the partnership and examines the customers' views of the airlines from the initial idea of travelling through to service delivery on the ground.

The first steps that were taken with the customer care strategy were the development of an information flow. Gerhard Romanescu explains, "We wanted to know when our best customers were on board so that we could ensure that they received the best service available. We found that this was not possible because the data was spread across many systems. We ended up doing the job manually and presenting a paper-based list to the crew before take-off." This simple feature proved to Swissair that its strategy would work. The list of best passengers was very popular on board the plane whilst the need for a data-fragmentation solution was demonstrated.



### Flying Pains

As a part of its customer care programme, Swissair regularly takes note of passenger opinions—especially those of its frequent flyers. One issue that was raised many times was a problem with punctuality at one of the Swissair hubs in Zurich, Switzerland. "Passengers were losing time at the airport because we would put hurdles in their way," explains Gerhard Romanescu. "They were losing as much as 20 minutes within airport processes. For frequent flyers who travelled twice a week that would add up to 80 minutes."

There was a pressing need to find ways to help passengers save time. Swissair looked for ways to check-in passengers automatically as soon as they arrived at the airport. This would then allow them to pass straight through to the gate. At that time, there was little in the way of technology to enable this but the solution that was arrived at was the use of cards with embedded chips that could be detected by antennae around the airport. As soon as a card was detected, it would be possible to start the check-in processes.

This was the foundation of the e>track solution that exists today. However, this could not meet other requirements for getting information to passengers on the day of the flight. This is where mobile phone technologies such as SMS messaging and WAP would come into the picture at a later date. WAP is an open, global specification that empowers mobile users of wireless devices to easily access live interactive information services and applications from the screens of cell phones. SMS is simply a service available on digital networks allowing mobile phone users to receive text messages on their digital phones. Each message may be a maximum of 160 characters long.

*"IBM offered to develop the WAP solution as a proof of concept,"*

*- Gerhard Romanescu, Vice-President of customer care management*

### Partnering with IBM

The original e>track development was carried out with assistance from CSC. The first real trial began during the summer of 1999 with 1000 members of the frequent flyer programme being given a special membership card with a chip embedded. Gerhard Romanescu explains the success of the early pilot. "This small experiment proved to be a resounding success," he says. "The customers put pressure on us to implement the solution immediately and demonstrated that e>track would prove good value to Swissair."

Swissair had developed a multi-vendor IT strategy back in 1998. This was based primarily upon IBM and Hewlett-Packard hardware. During the course of one of their regular

meetings with Swissair, IBM described its strategy and vision in the area of pervasive computing. As a direct result Swissair took the opportunity to illustrate a vision that it had for an automated check-in process. It also described the work that had already been carried out on e>track.

IBM and Swissair came to an agreement that would allow IBM to develop a WAP-based check-in system whilst also completing the e>track development. “IBM offered to develop the WAP solution as a proof of concept,” says Romanescu. “CSC had completed 95% of the e>track development to our complete satisfaction, but it was a natural progression to allow IBM to finish the job.” IBM took on the e>track prototype and did a significant “scaling up” exercise to enable Swissair to roll out this service to more users. For the WAP extension (including the remote check-in and flight delay notification), IBM was selected because of availability of research skills based in Switzerland (through IBM Zurich Research); at that time WAP was in its early days and advanced skills were needed.

After the initial discussions in the summer of 1999, IBM set to work at its labs in Zurich to come up with the Easy Check-In solution. By the end of November 1999, the solution was ready for delivery and acceptance testing. Commenting on the rapid delivery time, Gerhard Romanescu points out, “We are not implementers of technology but providers of e-business solutions. The times of two- and three-year projects with no intermediate delivery points is long gone. IBM needed to come up with a solution very quickly and this is exactly what it did.”

A project team from IBM Global Services in Switzerland was created under the leadership of Klaus Miserra and Stefan Kaeser. The team worked together with Romanescu and Giorgio Senn, the General Manager of e>track for Swissair. As a result it was decided that the system would be hosted on an IBM Netfinity server running Windows NT whilst IBM WebSphere Application Server was to be utilized for the hosting of all application components. An IBM DB2 database was to be employed to record subscriber information.

### **Easy Check-In and e>track for Frequent Flyers**

The e>track system provides a useful mechanism for allowing passengers to check-in for their flights automatically. However, the interface works in one direction—there are no facilities for passing information back to the passenger. This is where Easy Check-In has the advantage. In addition to the automated check-in capability, Easy Check-In is able to make use of the SMS messaging capabilities of mobile phones to pass information back to the passengers.

It is, in fact, a combination of both of these systems that provides the complete solution. Whilst a mobile phone can locate a customer down to the nearest cell, this will not allow the system to know where the individual is within that area. Cell phone cells are quite large, typically covering thousands of square meters; thus the “location” data available from the cell phone is not, currently, accurate enough to provide quality information. The e>track approach breaks down the airport into location areas so that intelligent decisions can be made about messages. For example, if a customer is in a location a long distance away from the departure gate, it is possible to send a reminder message 15 minutes before boarding when other, closer, customers do not get the message until closer to the departure time.

The basis for the Easy Check-In service is a WAP connection to the Swissair Web site. The site is able to identify individual customers from their phone numbers and is able to initiate a check-in process automatically. This requires a look-up to check which flights are booked and also the status of the flight. If there are any delays then a message is sent back to the customer. Alternative flights may be offered if they are available. “The joy of this,” says Romanescu, “is that you can stay in the office longer because you are already checked in. At the same time, you can check the status of a flight before you leave the office and react to any delays. There is one story of a passenger who closed an important deal by remaining in his office during the hour that his flight was delayed.”

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*- Gerhard Romanescu*

*“There is one story of a passenger who closed an important deal by remaining in his office during the hour that his flight was delayed”*

*- Gerhard Romanescu*

The simple check-in transaction executed by the Easy Check-In application creates a link between the passenger and Swissair's systems. The passenger is provided with all of the details that would normally be printed on a boarding pass—the seat number being the most important item. At the same time, the information is fed across to a number of other systems. For example, the revenue can then be recognised by financial systems, the capacity planning functions can be updated and the information is passed on to third parties who need to be able to deal with the fact that the customer has no physical boarding pass to show.

The whole solution is built upon IBM's pervasive computing technology, utilizing WebSphere as the middleware Web server software. This offers a multi-channel integration approach that allows users to access their solutions through the Web, WAP and variety of mobile and hand-held devices. This architecture provides a bridge between the standard business logic and the various markup languages that are required to drive the different devices. Pervasive computing has allowed IBM's Zurich Research Laboratory to use the same business logic throughout whilst providing broad device support.

The back-end integration was complex because the back-ends are diverse—there is no one database that has all the data that is needed. Further the addition of WAP and e>track fundamentally changed the business process. For example, the back-end system has been optimized over the years to support airline staff completing the check-in by entering such details as flight number and passenger name. From the WAP phone, the flight number is not entered. Significant modifications and extensions were necessary to enable the check-in process to be accomplished based on passenger name (i.e., Frequent Flyer number) only.

*“to get agreement we always have to show that there is added value. If there is no added value they will not support us.”*

- Gerhard Romanescu

### **Business Process Changes**

The primary purpose of the Easy Check-In system was to address problems caused by existing business processes. The aim was to remove the need for passengers to wait in line to carry out a check-in process that was, to a large extent, automatic. The only reason for manual check-in would be to take on luggage and to ensure the identity of the passenger. By offering Easy Check-In to its best frequent flyer members only, the passenger is identified via his identification number on his Travelclub Membership Card. Additional identification takes place when the passenger passes by the airport control and shows his passport or ID.

Swissair needed to carry out some delicate negotiations with airport authorities, customs and immigration officials in order to get agreement to implement the systems. This was achieved by demonstrating how the systems would be mutually beneficial. As Gerhard Romanescu points out, “We have to change things within the airports but to get agreement we always have to show that there is added value. If there is no added value they will not support us.”

*“An antenna nearby identifies the passengers as they step up to the kiosk. The Immigration official can welcome them by name and control the passport or ID of the passenger.”*

- Gerhard Romanescu

For example, e>track and the messaging features of Easy Check-In would improve overall airport efficiency by allowing passenger movements to be tracked and reminder messages sent to avoid delayed flight departures. The biggest gain, however, would come with the ability to share data with Immigration officials. Romanescu explains, “Immigration officials always complain that the quality of boarding cards is poor. With the e>track and Easy Check-In system they get an electronic version of the boarding pass on their screens. An antenna nearby identifies the passengers as they step up to the kiosk. The Immigration official can welcome them by name and control the passport or ID of the passenger.”

With the basic check-in processes automated, Swissair has also found that it has been able to use the passenger identification held within the membership card in other areas. For example, the card can be used to enable entry into business lounges (at Brussels Airport) and further ideas can be implemented when the antennae are deployed more widely.

## Benefits

So far both e>track and Easy Check-In are in the early roll-out stage and consequently the overall benefits are difficult to quantify. However, there are indications that the project has been well received both by airport and airline staff as well as Swissair's best customers.

The best measure of success is how much usage the system gets. Initially, Swissair gave away free WAP-enabled phones to 150 of its best customers with the provision that they should return them within 2 months if they did not wish to use them. Two months passed and only 2 were returned while the remainder subscribed to service. Customers willing to put their money behind a system is always an indication that it meets their needs.

The number of automatic check-ins has built up to around 300 each day. At the same time, the number of complaints about delays has been reduced and other internal costs have been reduced simply because the passengers can move about the airport freely, get to the gates on time and allow aircraft to leave punctually. These savings can be measured against the costs applied by airport authorities for check-in and other facilities. Swissair has calculated that it will break even with 500 automated check-ins each day.

Swissair has invested millions of Swiss Francs in their e-business customer care projects but it does not view this as a cost. Gerhard Romanescu explains, "We are providing a service to the customers and so it can be viewed as an investment in their happiness. We must always balance costs savings against the service that we wish to provide to the customer."

*"We wouldn't do anything differently. The emphasis was delivery, delivery, delivery."*

- Gerhard Romanescu

## Lessons Learned

The whole experience has been one of learning for Swissair and, to some extent, IBM who had a solution looking for a problem to address. Swissair had already demonstrated the value of the e>track concept and IBM was able to apply its technology to enhance the solution further.

Gerhard Romanescu is very happy with the way that things developed. He says, "We wouldn't do anything differently. The emphasis was on delivery, delivery, delivery." He also stresses the important role played by Swissair project manager Giorgio Senn who was responsible for managing the communications between Swissair and the various organisations involved in automating the end-to-end check-in process. "Giorgio initiated the whole thing. He started with a small focus group and he listened to everything that everybody had to say. This is where you can add the value and gain agreement. Often problems boil down to very simple issues."

*"We were a part of a unique experience for the airline industry. We are more than happy to share our experiences with the rest of the business in this emerging area of customer care."*

- Gerhard Romanescu

The important issue for Swissair was to concentrate on the solution and not the technology. It concerned itself with understanding the nature of the problems that it was going to come up against and built plans to deal with them. There is a belief that Easy Check-In might, eventually, be a part of much wider initiative to improve airport processes. As Romanescu puts it, "There is only an issue if you are unaware of the problems that might occur. We were a part of a unique experience for the airline industry. We are more than happy to share our experiences with the rest of the business in this emerging area of customer care."

However, not everything went as smoothly as Swissair would have liked. Most of the problems stemmed from the relative immaturity of the technology. Both e>track and Easy Check-In are business and technology "firsts" and as with any new technological development there are always obstacles to be overcome. Initially, the antennae used for the e>track system were early versions of the equipment. Some improvements have been made to keep them up to the required standard. There have also been world-wide shortages of the chips required for frequent flyer membership cards. Similarly, there were no WAP-enabled phones available at the end of 1999 and IBM had to negotiate directly with Nokia to get the 150 it needed to start its system trials. WAP facilities, so far, appear to be a potential

<b>System</b>	<b>Function</b>	<b>Technology Components</b>
<b>Antenna Controller</b>	Read information from Token Cards and send it to the Tracking Server	<b>Hardware:</b> Laptops or Desktops <b>Operating System:</b> Windows NT <b>Infrastructure SW:</b> ODBC driver for Microsoft SQL <b>Application SW:</b> VisualBasic or Java application
<b>Tracking Server</b>	Store information of Antenna events and trigger Application Server	<b>Hardware:</b> IBM Netfinity <b>Operating System:</b> Windows NT <b>Infrastructure SW:</b> Microsoft SQL 7 <b>Application SW:</b> SQL Stored Procedures, SQL Triggers and C DLLs
<b>Business Logic Services Server</b>	Processing logic for Easy Check-in and e>track	<b>Hardware:</b> IBM Netfinity <b>Operating System:</b> Windows NT <b>Infrastructure SW:</b> IBM HTTP Web Server IBM WebSphere Application Server IBM MQSeries for NT (for secure replication of Oracle tables) Oracle 8 (Customer Care data warehouse) IBM DB2 Universal Database a) holding a subset of Oracle tables b) Travel Club member lounge access info. c) user information for Phone Provisioning
	Easy Check-in consists of: Flight List Display, Check in to specific Flight, view check-in status, SMS notifications and phone provisioning via SMS	
	e>track consists of: Check In, Check In and Print Boarding Pass, Control Travel Club member lounge access	<b>Application SW:</b> Jave servlets (Java 1.1.7) Control Logic Java Server Pages ( JSP 0.91), Display content for WAP users, Configure SMS notification cycle, Manage Phone Provisioning JavaBeans (Java 1.1.7) , business logic JDBC, DB2 data access

Fig 1: Architectural Overview of Easy Check-In and e>track

hindrance to further development of the system but as new telecommunication technologies are implemented these restrictions will fall away. Overall the Swissair system has achieved greater than 99% reliability but there are issues surrounding “roaming” contracts and European-wide service availability can be unreliable.

A key lesson that IBM picked up was that building the front-end (i.e., WAP) is a big issue. Dealing with the effects on back-end systems and infrastructures arising from the use of the new front ends, can mean dealing with a variety of technical and business challenges.

#### **Future Plans**

This is a solution that is still going through its trials. It is a leading edge use of pervasive computing systems. So far it has proved very popular with Swissair passengers and has also been a success with ground staff. However, there are some barriers that must be addressed before the solution can be truly successful.



The biggest of these barriers is the need for Easy Check-In to be available at both ends of the journey. This would require Swissair to go through the same negotiations with all of the other airports serviced by its flights. Its ability to do this depends upon the airline's status within the airport—it is unlikely to gain much headway within Heathrow Airport, London without support from British Airways, for example.

The aim is to start with some of the leading destinations to create an end-to-end solution. The intention is to develop a co-operative partnership with airport authorities and other airlines in order to establish a shared infrastructure that can be adopted as a standard for automated check-in.

Swissair has time to overcome these barriers as it is limited by the availability and take-up of WAP technology. There is no doubt that Easy Check-In has the potential to change the way that airports operate in the future.

Finally, looking much further into the future, Swissair recognises the limitations of chips embedded within membership cards. It is looking at technology for face recognition by storing different measurements rather than a picture. That should prove to be a challenge.

For the moment though, the Easy Check-In and e>track systems represent a breakthrough in customer care that bring major, and much appreciated, benefits to Swissair's premier clients—an example of IBM's leading-edge technology and skills that make life easier for travellers.

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