

Swisscom Mobile Customer Case Study



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Swisscom Mobile delivers world's first 'best connected – any time, anywhere' mobile data service using Cisco infrastructure

Executive Summary

CUSTOMER NAME

- Swisscom Mobile

INDUSTRY

- Mobile Telecommunications Service Provider

BUSINESS CHALLENGE

- In a strategic response to the commoditisation and flat growth in voice traffic, Swisscom Mobile decided to meet its customers' desire for an easy-to-use mobile data service which would operate seamlessly over all current access technologies

SOLUTION

- Swisscom Mobile's Mobile Unlimited is the world's first mobile data service delivering seamless handover between GPRS, UMTS, EDGE and WLAN hotspot technologies that automatically links the user to the best available technology
- Cisco has contributed in the development of the first carrier class Mobile IP solution to support seamless mobility
- The technology is being offered as a field proven solution for other service providers to develop their own services

BUSINESS RESULTS

- New revenue streams
- Optimised network usage
- The promise of a new generation of converged mobile/fixed services

With Mobile Unlimited, Swisscom Mobile has launched a new generation of mobile data services. For the first time ever, users can roam across GPRS, UMTS, EDGE and wireless networks with service automatically switching to the best possible connection. Although easy to use, the service is technically complex and Cisco has contributed in creating a technology platform that can be shared with other mobile operators worldwide under the name of Unlimited Connection.

BUSINESS CHALLENGE

Despite increasing competition and a voice market approaching saturation, Switzerland's Swisscom Mobile has continued to grow revenue and customers, with a domestic market share of around 65 per cent and 4.3 million customers served by nearly 2,500 employees (2004 Report & Accounts).

Such success has been born of quality of service and innovation, and looking to the future the company recognises the growing importance of mobile data services. Carsten Schloter, Swisscom Mobile's Chief Executive Officer, sets the scene: "The volume of information that you have to handle in 24 hours is steadily increasing which requires that, basically, each and every minute you will have to have always-on connections to your business applications. Not only when you are in the office, but especially when you are mobile."

The inevitable overlapping cycles of innovation and return of investment mean, however, that Swisscom Mobile offers data services over a patchwork of network access technologies comprising:

- GPRS (General Packet Radio Service), offering 99.8 per cent coverage and data speed up to 48kbps



Prepared by Cisco Systems, Inc.

- EDGE (Enhanced Data for Global Evolution), a software enhancement to GPRS delivering up to 200kbps
- UMTS (Universal Mobile Telecommunication System), with speeds up to 384kbps to 90 per cent of the population (as at August 2005)
- PWLAN (Public Wireless Local Area Network) hotspots available at some 1,000 locations, delivering effective data rates of up to 2Mbps.

Navigating across networks to secure the best possible data service while on the move, however, promised to be a nightmare for users. Swisscom Mobile's Chief Technology Officer, Wolfgang Weber explains: "The problems for users when leaving the coverage of one network and entering the other one is that they have to re-establish all connections and restart all applications."

"THE VOLUME OF INFORMATION THAT YOU HAVE TO HANDLE IN 24 HOURS IS STEADILY INCREASING WHICH REQUIRES THAT, BASICALLY, EACH AND EVERY MINUTE YOU WILL HAVE TO HAVE ALWAYS-ON CONNECTIONS TO YOUR BUSINESS APPLICATIONS. NOT ONLY WHEN YOU ARE IN THE OFFICE, BUT ESPECIALLY WHEN YOU ARE MOBILE."

Carsten Schloter, Chief Executive Officer, Swisscom Mobile

SOLUTION

In response, the operator developed its vision of 'Unlimited Connection', a data service that would protect completely customers from different network handover complexity, acting like a car's automatic gearbox, sensing the best available technology and then automatically, securely and seamlessly connecting the user to it.

It would mean that a user could start to browse the Internet or access their company emails or data systems over breakfast and continue working without interruption, as a passenger in a car, or while waiting for an airplane. They would even be able to keep connected while on the country's high-speed trains as they travel at 230km/h from network to network.

In December 2003 Swisscom Mobile shared its vision with its technology partner, Cisco Systems. As well as providing most of the hardware and software used in Swisscom Mobile's corporate network, Cisco supplies the technology used by Swisscom Mobile in its 1,000 public wireless LAN (PWLAN) hotspots. Commenting on the nature of the operator's relationship with Cisco, Wolfgang Weber says: "Cisco's relationship to Swisscom Mobile is strategic in nature and is dominated by innovation." It was natural, therefore, for the operator to turn to the company to help it make real its vision of the new service that it would call Mobile Unlimited.

By September 2004 (just six months later) the solution had been developed and proven and the service launched with – importantly – a pricing structure based on the amount of data downloaded irrespective of the network used. Mobile Unlimited comprised three main components:

- Unlimited Data Manager, developed with the Swiss-based company Whitestein. Installed on a user's laptop, this software dashboard launches Mobile Unlimited with a single click of the interface's large 'connect' button and takes care of detecting the best available connection and the seamless handover to the next. Users can see what access technologies are available in their area and what technology is being used. Users are also able to prioritise their preferred technology where there is a choice of connection

- PC Data Card. The service uses a PC Data card, developed with the Belgium-based company Option. The first generation of cards provided integrated GPRS, UMTS and WLAN access, but with the upgrade of Swisscom Mobile's GPRS network in spring 2005 a variant has been available which adds EDGE capabilities
- Cisco Mobile IP Wireless Home Agent. Developed to securely maintain a user's IP address across a series of networks
- High-Speed Downlink Packet Access (HSDPA). Swisscom Mobile expects to launch in 2006 a multi-access PC Data card supporting HSDPA.



Swisscom Mobile offers two PC Data cards

The challenge for Cisco lay in the fact that currently there is no standard way of defining handover between WLAN, GSM or DSL networks. While handovers are well established within each of those networks or network segments, when a user connects to a WLAN a new IP address is dynamically assigned. This means that the IP address changes from one hotspot to another, forcing users to re-authenticate and log on to a new network with the new IP address – and consequently requiring all applications to be re-booted. With its vision, Swisscom wanted to achieve an improved handover experience between cellular and WLAN networks.

The solution lay in making changes to Cisco's Internetwork Operating System (IOS) and developing the world's first commercial application of the draft standard covering Extensible Authentication Protocol (EAP) using the GSM Subscriber Information Module (SIM) compatible with the Intelligent Agent for seamless mobility built into the Unlimited Data Manager.

“CISCO'S RELATIONSHIP TO SWISSCOM MOBILE IS STRATEGIC IN NATURE AND IS DOMINATED BY INNOVATION.”

Wolfgang Weber, Chief Technology Officer, Swisscom Mobile

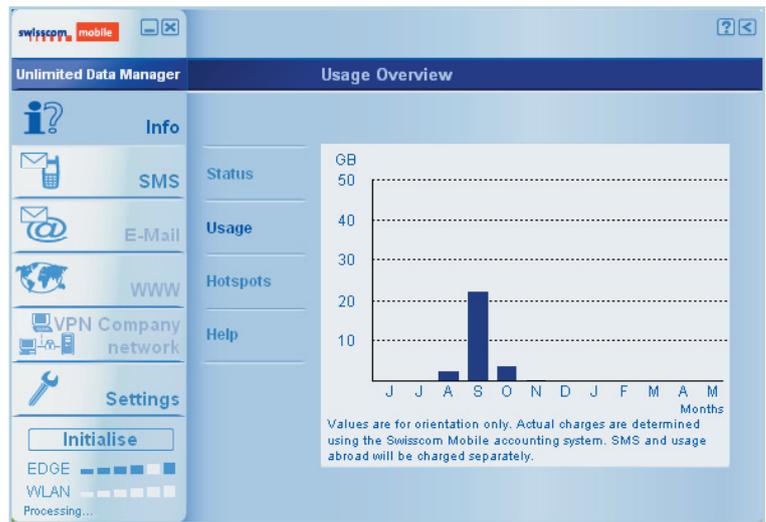
Cisco has played a leading role in defining Mobile IP, the internationally recognised extension to the IP protocol that allows roaming between different physical networks. It allows Mobile IP equipped devices to contact a foreign agent in the visited network which will establish a protocol tunnel to a 'home agent' in the roamer's home network, with the result that the roamer has access to services as if 'at home'.

The challenge lay in ensuring that a central point was able to keep track of the device and recognise it by its original IP address as it moved from one network to another, therefore avoiding the need to re-authenticate the device as it switched networks.

One of the central parts of the solution was to be Cisco's Mobile Wireless Home Agent technology. First developed for Code Division Multiple Access (CDMA) cellular phone networks in the USA, Cisco Home Agent software is part of Cisco's IOS and provides the anchor point for mobile terminals for which mobile or proxy services are provided. Critically, the Home Agent knows a user device's 'real IP address' – i.e. the

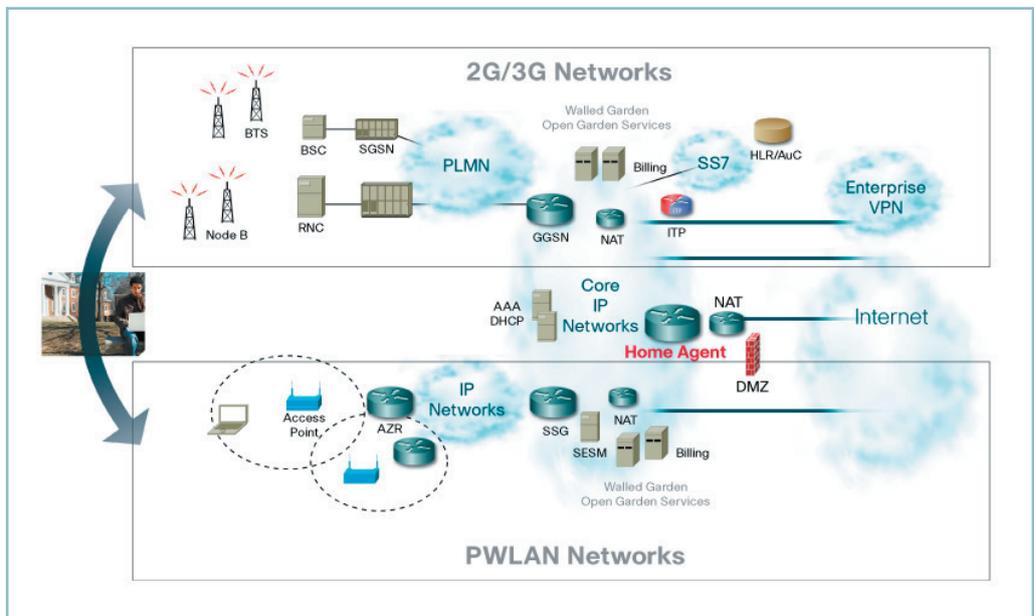
IP address that is assigned when a device first connects to a network – and is able to track that device even as it roams across networks.

Importantly, Cisco also had to enhance Home Agent to enable Swisscom Mobile to use Mobile IP as a tunneling technology which can pass through the boundary that translates a large number of private IP addresses (used in PWLAN as well as the GSM data access network) to a small number of public IP addresses (defined in the developing standard, Request for Comment – RFC – 3519 functionality).



The Mobile Unlimited Data Manager provides users with a wealth of information and options

The other key component of the solution was to provide EAP-SIM within the Unlimited Data Manager dashboard software, along with a Mobile IP ‘client stack’ on the PC. EAP is a means of authenticating a user on to a WLAN, while the SIM essentially contains the user-specific information used to provide billing details and authenticate a user onto a GSM network. With EAP-SIM, the user is not only seamlessly authenticated onto a network, special algorithms ensure all data – including user account information – is encrypted between the device and the wireless access point. However, EAP-SIM is a draft standard and Cisco therefore had to meet the challenge of implementing it for the first time in a commercial service.



Cisco’s Mobile Wireless Home Agent technology is at the heart of the Mobile Unlimited service

BUSINESS RESULTS

Analyses Research forecasts that by 2008 businesses in Western Europe will be spending €8.1 billion on mobile data services, up from €1.8 billion in 2003.

For Swisscom Mobile, mobile data is a valuable counter to commoditisation as Carsten Schloter explains: “As all applications including voice are moving towards IP, the danger for an operator would be a commoditisation of the transport business. Moving in areas like seamless connectivity, of security, ensures keeping value creation and of course also ensures keeping the customer on our networks.”

MEETING CUSTOMERS' NEEDS

Importantly, Mobile Unlimited is meeting customers' needs for 'any time, anywhere', easy to use access to the Internet and corporate resources, automatically using the fastest available access technology. A good example is Sven Thomann, a sports photographer with the world-famous Blick magazine. “As a sports photographer at Blick, I travel around the world and it is very important for me to stay in touch and to deliver my pictures as fast as possible. Mobile Unlimited is very easy to use. The benefits are that you can always transmit your pictures everywhere you are,” says Sven Thomann.

Not only is Mobile Unlimited easy to use, it is also proving simple for the photographer's IT support team to administer. Hansjörg Grolimund, Head of IT Infrastructure Service, Ringier (which publishes Blick) comments: “Ringier staff can access their data and applications no matter where they are. And that makes them highly productive. It's moreover a very safe solution, and reduces the input required from IT support. That's why it's standard on all Ringier laptops.”

“THE ROLE OF MOBILE IP IS THAT FINALLY, IT WILL BE THE GLUE IN ORDER TO DELIVER THIS CONVERGENCE TO THE END CUSTOMER. CISCO'S IP NEXT GENERATION NETWORK IS GOING TO BE INSTRUMENTAL IN DELIVERING THIS VISION INTO REALITY”

Carsten Schloter, Chief Executive Officer, Swisscom Mobile

The development of the Unlimited Connection solution is considered so important that Swisscom Mobile is working with Option and Cisco to make it available to other operators in a bid to drive forward the standardisation of Mobile IP access.

As Wolfgang Weber says: “There is no need to reinvent the wheel. Any operator can experience the ease of creating seamless services when using Unlimited Connection.”

Looking forward, Carsten Schloter says that Swisscom Mobile shares Cisco's vision of services without boundaries and sees the new service as a further step towards convergence, both of fixed and mobile networks and of voice and data on both fixed and mobile networks. “The role of mobile IP is that, finally, it will be the glue in order to deliver this convergence to the end customer. Cisco's IP next generation network is going to be instrumental in delivering this vision into reality,” Carsten Scholter explains.

Mobile Unlimited won the 'Best Enterprise Application' category at the GSM Association Awards 2005



CISCO TECHNOLOGY BLUEPRINT

On the PWLAN EAP-SIM side of the project, Swisscom Mobile deployed redundant Cisco Service Selection Gateways (SSG), Subscriber Edge Services Managers (SESM) and Cisco Access Registrar Remote Authentication Dial-In User Service (RADIUS) servers for Authentication, Authorisation and Accounting (AAA) and Cisco IP Transfer Points (ITP) for the interconnection with the traditional home location register for user authentication and service authorisation. At the PWLAN hotspots, Cisco Catalyst Series Switches (3550, 2950) connect Cisco Aironet Access Points (350, 1100, 1200) to the network, while Cisco Access Routers (1760, 1721) provide the connectivity back to the data centre.

The Mobile IP component comprises Cisco Home Agent running on Cisco Catalyst 6500 Multiple WAN Application Modules (MWAM) at both Swisscom Mobile's redundant data centres. The need for port address translation of the Mobile IP tunnel was met by developing the Home Agent software to support Request For Comment (RFC) 3519 functionality. The home agents run in active/standby mode with an extension of the Hot Standby Routing Protocol used to exchange their Mobile IP binding tables. This functionality allows a stateful failover in case of Home Agent software or hardware failure.

The Mobile IP client stack running on the client PC uses Collocated Care of Address (CCoA). This means that the client gets a real IP address from any access network it is attached to. For example, the IP address on the WLAN card might be x.x.x.x, and the one acquired via the GPRS/UMTS access network could be y.y.y.y. The client doing CCoA would then, depending on the priority of the access network, either use the x or the y address as its mobile IP tunnel source IP address. The mobile IP address that the client will use to actually address its 'payload' traffic is assigned during the mobile IP tunnel set-up process through the tunnel via AAA server assignment.



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