



*Martin Dawes Systems and
IBM - delivering enterprise
management solutions with
DISE*



Timeline

Before 1993	Previous in-house billing system in place.
1993	France Telecom implementation highlights need for new architecture.
Early 1994	MDS invites IBM to propose solution for DISE.
1995	First DISE development for use with any subscriber-based utility.
1997	MDS becomes independent company
December 1998	Realisation of RMS Solution - DISE 2.00
March 1999	Customer Self-Care development takes place. IBM provides project support and technology.
August 1999	Customer Self-Care delivered to BT Cellnet Lumina.
December 1999	WAP Interface development delivered.
Q4 2000	Completion of Corporate Self-Care features.
Q1 2001	Extended corporate reporting and Sales Order Processing.
Q2 2001	DISE 3.00

Overview

Martin Dawes Systems (MDS) is a specialist business that focuses on providing a leading edge Enterprise Management Solution (EMS) to the converged communications industry. Today, Martin Dawes System's products and outsourced solutions are used to manage all aspects of sales, marketing, order management, Customer Relationship Management (CRM), billing and customer care needs of leading converged communications service providers across the globe. Companies such as BT Cellnet, France Telecom, Vodafone, Telstra, Cable and Wireless and others, entrust over 4.7 million customers to MDS's Enterprise Management solution, known as DISE. In order to serve its diverse geographical customer base, MDS maintains development and support centres in the United Kingdom, Ireland, Australia, and the USA.

It didn't start out that way, in fact things began back in the early 1990's when the parent company, Martin Dawes Telecommunications (MDT), was seeking a subscriber management and billing solution for its growing Mobile Virtual Network Operator (MVNO) business. At that time there were no products available on the commercial market that could match Martin Dawes' requirements and so MDS, the internal systems development division of MDT, set about developing its own solution.

The result was DISE, a complete subscriber management solution designed to run in an IBM AS/400 environment. DISE was designed to provide true enterprise management, encompassing sales channel management, CRM, Billing and Revenue Assurance, with particular emphasis on the wireless and IP communications marketplace.

MDT had been keen users of the IBM AS/400 platform since 1989 and was amazed at the AS/400's stability, scalability and flexibility compared to other platforms. Working as the IS/IT division within MDT at that time, MDS was given the responsibility for systems development within the business and took on this project. In 1997 MDS became an independent business supporting MDT and developing solutions that it could sell to a growing worldwide band of telecommunications service providers. DISE was then - and still is today - the flagship product of MDS. DISE is currently being used by major service providers across the globe and manages millions of individual subscribers, SMEs and large corporates.

This case study examines the evolution of DISE from its early roots through to the latest developments in Self-Care and Wireless Application Protocol (WAP) interfaces, and also looks beyond to see what the future will provide. It also looks at the role that IBM has played in this evolution and how its partnership with MDS has developed into that of a major technology provider. Finally, the benefits that have been gained by MDS and its customers are analysed.

The Problem to be Solved

In 1994, frustrated by a lack of 'off-the-shelf' solutions to efficiently manage a diverse cellular subscriber base and complex billing structures, MDT, the then parent company, began internal development of its own customer care and billing system. The result was MDS's first generation customer care and billing system (CC&B), DISE. With strong foundations set, MDS then continued to develop DISE's core functionality to realise the Enterprise Management Solution that we see today.

Prior to DISE, MDS developed its early billing system using its own resources. The resulting solution matched the requirements of the Martin Dawes organisation well and was considered to be unique within its industry. France Telecom was so interested in this billing system that it took a stake in MDT just to gain access to it. Modifying the existing billing system to function correctly within each different area proved to be a maintenance nightmare. A new solution was needed. Said Lars-Olof Svensson, Sales & Marketing Director at MDS, "The billing system that we had was good and we wanted to sell it to

The Company

Martin Dawes Systems
Based in Warrington, Cheshire, UK

Independent software vendor of business support solutions serving the wireless and internet communications market world-wide

250 people in 4 countries

Global customer base

>5,000 seats in use

Web Sites

www.martindawessystems.com
Corporate and product information

www.btc-lumina.com
Customer Self-Care pilot site

The Technology

IBM® WebSphere™ Application Server

IBM VisualAge™ for Java®

IBM DB2®

Wireless Application Protocol (WAP)

IBM AS/400® Servers
(IBM eServer iSeries Server)

RP/400®

The Service

IBM Global Services

The Benefits

Implementation and migration times reduced by up to 67%

85% of DISE components are common to all customers. "Customization only" required in up to 15% of modules.

Reduced total cost of ownership of approximately 85% compared to integrated multi-product solution

Flexible and scaleable architecture capable of dealing with over 15 million subscribers

Reductions in volume of calls to Call Centre

Reduce customer churn through improved satisfaction and loyalty

Integrated system with consistent, intuitive front-end look and feel creates ideal environment for multi-skilled customer facing staff.

external customers and business partners.” Gary Steen, Head of Product Strategy added, “The previous system had grown organically but could not be modified easily. We had to have a new structure.”

The requirement was for a solution that would fit MDS’ business strategy to take its customer care product to a global market. From the business perspective, the key functions that had to be addressed included:

- Sales and Marketing
- Customer Registration
- Customer Relationship Management
- Invoicing and Tariffing
- Credit Control and Debt recovery
- Sales Order Processing and Hardware Services
- Management Information Services

In order to address these key requirements the solution demanded an architecture that could be modified very easily to account for the differences between individual solutions. If the product were to be successful it would also be necessary to support and maintain multiple variants in the converged communications market. The architecture would need to scale to provide support for millions of customers and it needed to be extensible to allow MDS to take advantage of any new technological advances that might appear in the future. Hence DISE was designed to have a set of core modules addressing all of the major requirements of customer care and billing for the telecommunications market. Additionally, MDS extended this core ‘plug and play’ technology with satellite modules that could be customised to meet the individual needs of businesses, customers and regulators. This architecture also helped to simplify the installation and integration processes. As a result of this decision-making process the elements were put into place to allow for the creation of a world-class product.

The IBM Partnership

MDS went to the market and invited proposals from organisations that wanted to be involved with the project management, design and development tasks. Along with the software houses that took part in the tender process, IBM was invited to participate and, ultimately, succeeded in winning the contract. “Together, IBM and the Martin Dawes Systems expert development team came up with a design that placed 85% of the functionality into a common architecture which meant that each new implementation would only require up to 15% of the solution to be modified,” says Steen. “At the same time, design standards were applied that ensured a common user interface throughout DISE.” One of the key elements to IBM winning the business was its exhaustive knowledge of pervasive computing technologies and the associated impacts on business. This experience and knowledge was backed up by the extensive capabilities of IBM’s e-business product set, including elements such as VisualAge for Java, WebSphere, DB2 database, and the AS/400 that together demonstrated a strong solution design. “IBM supplied an in-depth knowledge of new advances of technology in the rapidly changing IT world” explains Steen.

After the first phase of development, the next stage was to start extending DISE to take into account the needs of future wireless technologies whilst also looking to provide better facilities for customers. The whole process has been evolutionary with each stage building upon the same technology platforms and underlying architecture. At every stage, the joint

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- Gary Steen, Head of Product Strategy

IBM and MDS team has needed to prove that the design was still the best route forward. Development has been a collaborative task with IBM supplying the initial skills and then providing mentoring and skills transfer as MDS developers have taken over. Gary Steen points out, "MDS has gone back to the market each time a new evolution of DISE has been planned. As time has gone by, IBM has become the preferred supplier but it has to prove its technology every time."

With time, the MDS-IBM relationship has grown to be very strong. The success of DISE has meant that the AS/400 platform is being stretched and used to meet new requirements. It has been IBM's task to continually prove to MDS that it had the special skills and the technology that would allow DISE to remain within the AS/400 environment.

An excellent example of this has been seen quite recently as MDS started to look at the use of WAP for customer self-care. WAP is an open, global specification that empowers mobile users of wireless devices to easily access live interactive information services and applications from WAP-compliant devices such as mobile phones. Typical services delivered via WAP include e-mail, customer care, call management, unified messaging, weather and traffic alerts, news, sports and information services, electronic commerce transactions and banking services along with online address book and directory services. This technology clearly offered MDS the opportunity to extend DISE into the area of Customer Self-Care. Most telcos receive large numbers of calls from customers to check on billing information and account status questions. Customer Self-Care elements of DISE give the customer the ability to check these details for themselves, from their cell phone, without operator intervention.

This has required the modification of the presentation layer so that the user interface can function with mobile phones and Web technology. Steen notes, "IBM had access to the Web enablement skills that we could not have provided quickly. The success of this work will lead to significant improvements to DISE in the future."

A second activity has seen a growing collaboration between IBM and MDS in the benchmarking and testing of the IBM AS/400 platform with the aim of making sure that the hardware is keeping up with the technology. MDS regularly visits the IBM Research Laboratories in Rochester, Minnesota, USA and has carried out benchmark tests on DISE to check scalability. "So far we have simulated up to 1 million live subscribers with response times of 0.3 seconds on the desktop. Our calculations estimate that we could take that up to 15 million users – and beyond – on a 24-way AS/400," says Steen.

The DISE Solution

Any company that needs to manage converged communication services can use DISE. It is structured in a way that allows the functionality to be accessed by internal administrative staff or the customers themselves through Web connections and using WAP phones. The development of Customer Self-Care has been carried out using elements of IBM's pervasive computing suite, including IBM VisualAge for Java and WebSphere.

Creating the Infrastructure

Physically, the emphasis has been on using the IBM AS/400 as a single platform with the internal DB2 database being utilised to its full extent. This means that the customer has a single manageable environment with no added costs for database technology. There is no need to synchronise data across customer information, usage information and historical information systems - all data resides within one database. "The customer buys an AS/400 and DISE," points out Svensson. "Implementation is rapid and more cost effective because of its simplicity." Multiple DISE solutions are able to co-reside on the same AS/400 system and multi-threading has been implemented to enable full utilisation of multi-processor environments. MDS is also able to offer data centre and call centre solutions to support DISE if these services are required.

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The whole of DISE is constructed as a collection of more than 3,000 business objects. The majority of these objects are built into a central core that does not change from one implementation to the next. This core makes up 85% of the overall solution whilst the remaining 15% is integrated through satellite objects that use a standard interface to the core system.

The business objects that are included within the core of DISE cover all of the common functions involved with customer management, account management, billing, rating & tariffing, sales and reporting. These are then supplemented by the functions within the satellite objects that are customisable to meet the needs of each specific solution.

The core modules include:

- * Prospect Registration
- * Rating
- * Marketing
- * MIS
- * Sales Commissions
- * P.O.S. Integration
- * Self-Care
- * Number Management
- * Subscriber Management
- * Service Tariffing
- * Billing
- * Invoice Charges Enquiry System
- * Workflow Management
- * Hardware Services
- * Order Management



The satellite modules available are:

- * Credit reference
- * Optimiser
- * Payment Interface
- * Network Services
- * Financials
- * Billing Format
- * Debt Recovery
- * Network Interface



A fundamental characteristic of DISE is that each module can be customised using parameter-based soft coding. This makes the system highly flexible without users having to seek assistance, or make change requests, from the development team. Such flexibility is most clearly demonstrated in areas such as tariffing, rating, billing, discounting, promotional structures, credit control processing and database marketing. In a similar way DISE can be customised for various languages very simply by utilising message constants for the storage of language literals throughout the application. This allows both customisation of selected fields and complete language translation, without the need to recompile or develop any programs.



To complement the DISE solution, MDS has also partnered with other leading solution vendors in the areas such as Optical imaging for the storage of incoming customer correspondence and also high availability integration to ensure continuous access to the system 24 hours x 7 days a week.

With the DISE system now having this architecture, MDS has found that the average time taken to modify DISE for a new implementation has come down from 9 to 3 months , a

Adding a service using DISE on a WAP phone

saving of some 67%. This represents a huge cost saving for the customer and allows the business to move rapidly forward.

The early versions of DISE were based upon the standard AS/400 green-screen user interface. However general trends in IT have made it necessary for MDS to offer alternative user interfaces. In order to achieve this, the presentation component of DISE has been separated from the business logic, which allows the underlying business objects to be accessed from a variety of different user interfaces and guarantees consistency wherever the user is situated.

The first development has been with the Web. The presentation layer offers Web users Java technology that executes on the desktop. Whilst the development of the Web interface was proceeding, MDS embarked upon the next step by developing a WAP interface utilising the Java technology. In common with most WAP implementations, the restrictions of the user interface mean that some design modifications have been required.

Said Lars-Olof Svensson: "Providing customers with easy access to their account information has been a continuing challenge for the customer care industry." Gary Steen added, "With the WAP-enabled version of DISE, we have taken a giant leap forward by allowing customers to use mobile phones to access the many features of DISE at any time and from any location."

Developing Business Processes

Customer service is moving online and DISE has been at the forefront of this development with its industry leading online Self-Care solution that has been successfully deployed by, amongst others, BT Cellnet Lumina. Within the telecommunications industry, customer care has been a service that has been available traditionally through a call centre. Whilst this approach is never going to disappear completely, there is an increasing desire on the part of service provider and customer to automate some of the functions that are on offer. Svensson points out: "We are seeking to address the top ten call centre issues through the provision of Customer Self-Care. In one of our customer's call centres, up to 15,000 calls are received every month just to get a copy of the latest bill. We are expecting DISE to reduce that number significantly and thus increase the bottom line for the operator."

The key to enabling self-service functions has been the separation of the presentation layer from the remaining business logic within DISE. "The combined IBM and MDS team has been central to this process with the initial design that allowed the development to be carried out quite easily, with the technical skills required to provide a Web service and then WAP. It is the availability of these special skills that attracted MDS to IBM in the first instance and IBM has proved its ability to deliver leading-edge technology quickly."

Business Benefits

The benefits that have come from the DISE development need to be looked at from two angles. Firstly, there are the gains that have come directly to MDS as the developer and supplier of DISE and, secondly, there are the other benefits that are experienced by the DISE customer and the eventual service subscriber.

Technology Benefits

The most obvious of these benefits has been a remarkable cost efficiency achieved by resisting all temptation to move away from the AS/400 platform. The AS/400 platform is well understood by MDS and they have significant skills and experience with this technology. MDS has made the AS/400 their platform of choice in association with IBM's strategic software products, including WebSphere, VisualAge for Java and DB2. This methodology

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Every time a new technological challenge has presented itself, MDS has been able to leverage IBM, the AS/400 and associated software tools to create a solution.

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has allowed MDS to maintain a focussed group that knows the platform well. MDS has used IBM's skills to develop new technologies but has its own skills available to maintain the resulting solution. Gary Steen is quite candid about this strategy. He says, “There have been times when it may have been easier to add features to DISE using different technologies but, even when the technology has been advancing so rapidly, the AS/400's adaptability has kept it ahead of the field. It was important to keep the end solution as compact as possible – all in one box.” Every time a new technological challenge has presented itself, MDS has been able to leverage IBM, the AS/400 and associated software tools to create a solution and in turn provide a cost effective solution to its clients.

As a final consideration, the software architecture devised by MDS and IBM ensures that DISE can be implemented quickly to allow rapid reaction to market changes. All of the customisation fits into the satellite functions that make up the final 15% of the solution. All changes are applied here and allow everything from simple addition of corporate identity through to complex variations on the business processes.

Customer and Subscriber Gains

For the operator this cost efficiency ripples through the supply chain in the form of massively reduced total cost of ownership (TCO) figures that can be passed onto the end subscriber. MDS is able to sell DISE at a favourable price compared to all other Independent Software Vendors (ISVs) because it does not have the maintenance problems that come with supporting many different platforms. At the same time, the customer's only other initial cost is the purchase of the AS/400 required to run the solution. There are no additional database costs or extra technologies to be plugged in and there are no integration issues. Svensson illustrates this with a recent TCO test. “In an independent study, DISE was put up against another equivalent solution and the costs of the hardware, development resource and maintenance were taken into consideration. Overall, the MDS solution was found to be 12.5% of the cost of the competitor.”

The low TCO compounded with the complete enterprise management functionality are good reasons for operators to consider the use of DISE. For many businesses this might be enough justification but, somewhere along the line, it becomes necessary to turn that expenditure into savings somewhere else. This is where the recent developments in Customer Self-Care are going to make an impact.

Self-Care

Self-service functions are the business value win-win opportunity that is available to businesses everywhere. In the case of DISE, by allowing customers to manage their own accounts and billing tasks on a 24 by 7 basis the end user feels empowered and in control. This functionality is ideally suited for delivery via the wireless Internet mechanism, WAP. The customer feels good about this and starts to develop a sense of brand loyalty. The customer also feels good about ‘cutting out the middle man’ – a situation that is actually more beneficial to the service provider.

The Customer Self-Care features of DISE are targeted at the top ten types of call received by call centres. “The reason that call centres receive these calls is that, up until now, there has been no way to get the information from the billing system to the customer at the time that it is actually needed,” points out Steen. “However, with DISE, the number of calls coming into the call centre will be reduced significantly as subscribers use Self-Care functions over the Web and through their WAP phones,” he adds. “This reduced volume of calls means that the size of the call centre can be reduced with resultant savings in office resources, equipment and manpower.”

Conclusions

Martin Dawes Systems has to consider its strategy from both its own commercial perspective and that of its customers. Through the introduction of its Enterprise Management Solution, MDS has adopted an evolutionary approach to CC&B, a unique solution developed from experience gained as a division within Martin Dawes Telecommunications, a Mobile Virtual Network Operator. Being part of MDT provided the experience and the knowledge that was needed to create DISE. It allowed the functionality to be developed and taught MDS an important lesson. As Gary Steen puts it, "The first billing system was one of the best available at that time – but it could not be modified easily to suit different businesses."

The first big step forward was the design for DISE that IBM produced in collaboration with MDS. The design centred on producing a simple architecture with a modular structure. This placed all of the fixed functionality into a strong core solution whilst all of the variable features were incorporated into satellite objects. There is no 'spaghetti logic' to be unravelled each time a new implementation or modification is required. The changes are made within the 15% of functionality that is separated from the core. This minimises the effort involved with each implementation and allows MDS to react quickly to market changes. The potential for chaos has been removed from the system.

Another choice for which MDS can take credit is its insistence upon sticking to the IBM AS/400 platform. From the customer perspective, this has simplified the solution significantly and has proved to be markedly more cost efficient than rival solutions. At the same time, MDS has been able to retain its own skills focus whilst looking to third parties for specialist technology skills as and when necessary.

In this role, IBM has been a worthy partner – proving its capabilities early on and earning the status of preferred solution provider. It is in this role that IBM has been able to assist MDS by developing the AS/400 environment and also by introducing its pervasive computing strategy in a way that enabled MDS to take a technology leap without it being a massive step and in a fashion that has provided WAP and Web capabilities at exactly the time that the demand is increasing. MDS has retained a core team at the nucleus of DISE and have utilised their own knowledge of the business market and the skilled resources of IBM to extend the system into the advanced solution that it is today.

DISE 3.00

Martin Dawes and IBM Global Services have joined forces on the development of DISE 3.00, a move that will allow DISE to take full advantage of recent developments in Java technology.

DISE 3.00 will be available in Q2 2001 and will provide an n-tier solution that separates the presentation layer (view objects), the business logic (model and/or controller objects) and the data access logic (persistence objects). The architecture can be seen in Figure 1. DISE 3.00 will adopt a thin client approach such that no data resides on a Client's hard drive.

Only a small subset of functionality will be executed on the client (mostly dealing with the formatting of data and basic validation etc.). The main functions that will execute on the client will deal primarily with the presentation logic and those business rules that are intrinsic to the editing and manipulation of data.

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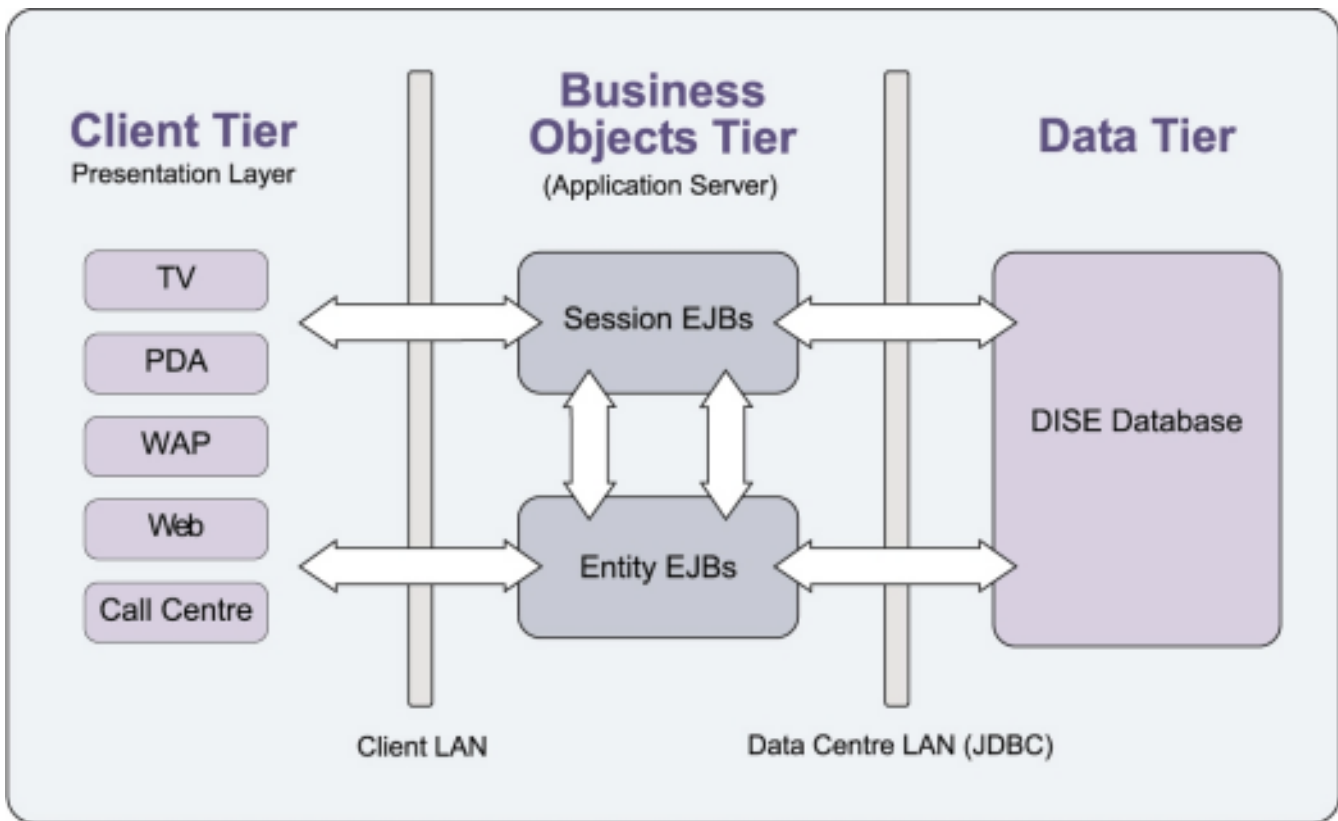


Figure 1: Architecture of DISE 3.00

DISE 3.00 Architectural Layers

A brief description of the three layers is given below.

Client Tier

- This layer is responsible for generating the GUI for the user. There is a limited amount of field validation and processing performed. This layer is implemented using Java Swing components. Communications with the Business Objects are handled using Swing.

Business Tier

- This layer will hold the business objects for accessing the MIB (Management Information Base). The layer will be implemented in Java, making use of Enterprise Java Bean (EJB) technology. The EJBs will be deployed in IBM's WebSphere Application Server. This layer will form the basis of an open-systems architecture allowing further User Interfaces to be integrated in the future.

Data Access Tier

- *Data Access & Pooling*
This layer provides a necessary capability of managing the Business Objects access to data resources (file paths, database connections, etc.). The focus of this layer is to maintain DISE system performance.
- *DISE Database*
This layer is the actual repository for the persistent data in the system.



Figure 2: DISE 3.00 Web screen

These developments will help position DISE to take advantage of emerging technologies. It is clear that the new structural design will allow DISE to be especially flexible with regards to the end-user client and adapting to change rapidly.

Future Plans

Customer Self-Care is the main area of focus at this time. The first release of WAP functionality has just been made with the ability to view account details, subscription details, unbilled units, service addition, password change and query logging. The second release in October 2000 included Corporate Self-Care functions such as phonebook management, drilldown into detailed data, cost centre usage and bundle enquiries. As Gary Steen says: "Corporate customers have real problems analysing massive bills covering many items of equipment. We must continue to provide a solution to this kind of problem."

The provision of true enterprise management systems solutions, encompassing sales channel management, CRM, Billing and Revenue Assurance with particular emphasis on the wireless and IP communications market place remain key areas of business development for MDS. Similarly with new technologies rapidly developing (for instance to enable GPRS & 3G services in the wireless market) as well as the potential that xDSL and optical transmission technology represents for the delivery of fixed network broadband services, there are many market challenges and opportunities that Martin Dawes Systems will be addressing. IBM will be there to provide critical support as and when MDS demands it.

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