

POWER TO RUN YOUR BUSINESS

sage

CRM Mid-Market Edition

---

# Architecture White Paper

---

Copyright ©2005 Sage plc. All Rights Reserved.

This document, due to its technical nature, is subject to possible errors and omissions.

# CONTENTS

<b>Introduction</b> .....	3
<b>Sage CRM Mid Market Edition Internet Architecture</b> .....	4
Interface Services .....	4
Business Logic Services .....	5
Database Access Services .....	5
<b>Benefits of Sage CRM Mid Market Edition Internet Architecture</b> .....	6
Single Server Installation and Centralised Management .....	6
Scalability .....	7
Adaptability .....	8
Automated Workflow .....	10
Rapid Deployment .....	10
Secure Access .....	11
<b>Typical Configuration for Sage CRM Mid Market Edition</b> .....	13
Components of Sage CRM Mid Market Edition Configuration .....	14
<b>Closing Comments</b> .....	15

# Introduction

Investing in a Customer Relationship Management (CRM) application is no different than any other business management software investment – whether you are looking for an enterprise level software application or a department level solution, you expect a quick and measurable return on your investment. Before investing in a CRM application, consider several aspects of the application including its features, support for existing and emerging technologies, initial cost, ease of use, integration with other applications, and more. By far, the most important aspect of any enterprise wide business management application, including a CRM application, is its underlying architecture. A well-designed architecture will accommodate future growth and adapt to business changes without affecting the performance of the application or requiring an exhaustive “re-implementation.” An application’s customisability, adaptability, portability, scalability, and extensibility, are all functions of its architecture.

**Sage CRM Mid Market Edition (MME)** is an enterprise-level feature-rich application, built on a fully integrated Internet architecture that provides online access, rapid deployment, process automation, a component framework and interaction through multiple business channels.

In an Internet architecture, the corporate data, the operations performed on that data, and the user interfaces are built-in clearly defined layers that communicate using Internet standards<sup>1</sup>. Internet architecture is characterised by single-server installation, thin client deployment, centralised administration, portable application, and optimised performance on WANs. The Internet architecture of Sage CRM MME offers superior performance across all user deployment scenarios including disconnected access (laptop), Internet access (wired and wireless), Dial-up access, and in-office access (Local-area Network – LAN and Wide-area Network – WAN).

This document describes the underlying architecture of Sage CRM MME and explains how the application of its Internet architecture can become a competitive advantage for your firm.

---

<sup>1</sup> Sage CRM MME utilises the following Internet standards and technologies: TCP/IP, Hyper-text Transport Protocol (HTTP), ActiveX, JavaScript, Active Server Page (ASP), File Transfer Protocol (FTP), Simple Mail Transfer Protocol (SMTP), eXtensible Markup Language (XML), Web Server, Web Browser and Secure Sockets Layer (SSL).

# Sage CRM Mid Market Edition Internet Architecture

Most enterprise CRM applications – even applications with Web interfaces –are built using a client / server architecture, with the administrative overhead and expense of support for both deployment paradigms. Sage CRM MME, however, is powered by a pure Internet architecture that leapfrogs the client/server technology prevalent today. As shown in Figure A below, the Internet architecture of Sage CRM MME includes three distinct layers that communicate amongst themselves using Internet standards.

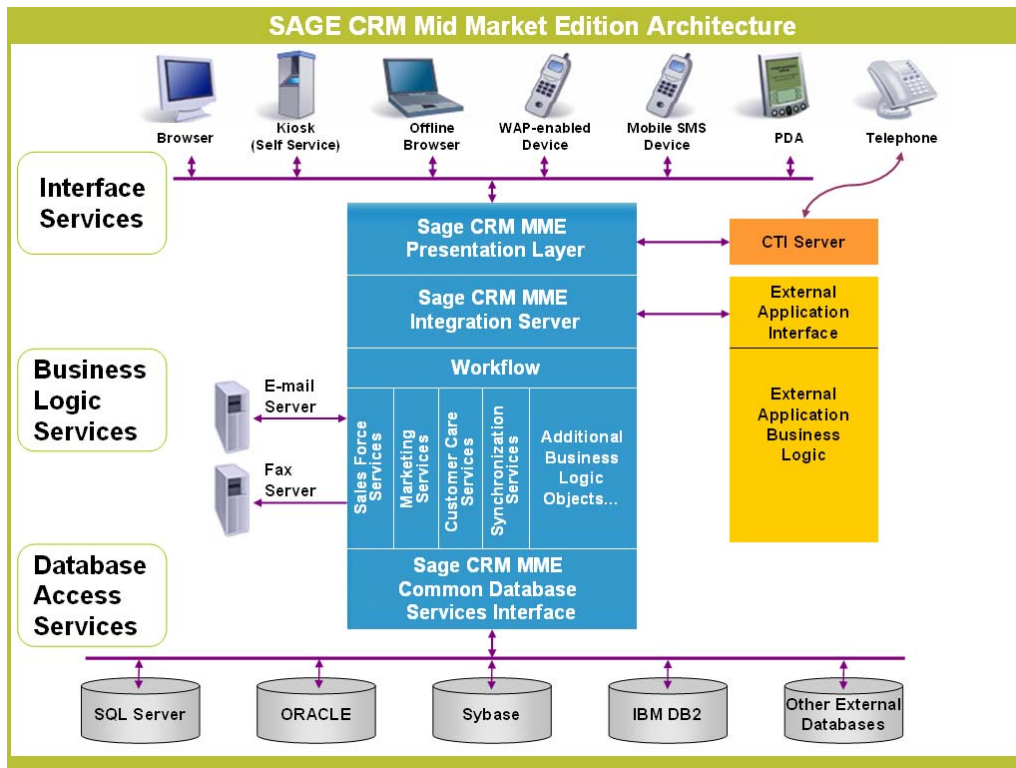


Figure A

## Interface Services

Traditional methods of communication between vendor and customer such as phone, fax and mail have been augmented by Web, e-mail and wireless communications (WAP, wireless Internet, etc). In today's economy, Internet access, both wired and wireless, is the fastest growing access method to business information. Sage CRM MME's Internet architecture provides universal access to CRM applications for the mobile workforce by delivering the solution within a standard Web browser; Wireless Access Protocol (WAP) enabled device, mobile SMS device and Personal Digital Assistant (PDA).

The wireless and Internet device layers (components of Sage CRM MME Presentation Layer) manage the connection between the Sage CRM MME application and the Microsoft® Internet Information Server™ (IIS). The Presentation Layer detects the device type being used (browser, PDA, etc.) and outputs the user interface in the format most appropriate for that device.

### **Business Logic Services**

The Internet architecture of Sage CRM MME provides a framework that enables companies to integrate information from multiple applications into CRM solutions, making this consolidated information available through an intranet, the Internet, and/or mobile Internet platforms

The Business Logic Services layer exposes business functions such as opportunity management, customer service, marketing automation, territory assignment, customer self-service and workflow. These functions have several components that work together to coordinate the delivery of information and functionality to clients. These components check user security, maintain user persistence (remember what a user is doing), synchronise data with mobile users, return information from the database, generate Web pages from data, perform transactions, process business rules and logic, and much more.

Exactly which functions are available to Sage CRM MME users is managed by the server side Sage CRM MME Dynamic Link Library (DLL). The DLL communicates with the Web server using Internet Server Application Programming Interface (ISAPI) technologies. To add CRM options or CRM users the Administrator simply needs to enter a new activation code without the need to reinstall the software. Users can then start using any additional functionality almost immediately.

### **Database Access Services**

All database operations in Sage CRM MME are performed through components of the Common Database Services Interface (CDSI) layer. To maintain data integrity, the CDSI layer validates data updates, such as sales leads being imported to CRM from an external application, before they are written to its database. This validation prevents any new data from corrupting the database or creating duplicate records. Because all database access is abstracted into the CDSI layer, adaptation to a new database can be done quickly in one place (the database driver). The database server can be located on the same platform or on a separate network-connected server. Sage CRM MME stores, retrieves and collates data from these databases, and presents it in a uniform manner to the user.

# Benefits of Sage CRM Mid Market Edition Internet Architecture

## Single Server Installation and Centralised Management

Sage CRM MME may reside on a central server(s) with full access to the CRM solution provided via an Internet browser. This also allows administration of the CRM system to be more manageable and less expensive. Users of the application benefit, as they can access the centralised database anywhere, anytime.

This single server installation makes Sage CRM MME a highly cost-effective solution for companies with mobile employees and multiple offices worldwide, as well as for companies with large numbers of employees in a single building, where a typical client / server deployment can be difficult and expensive to maintain. Companies no longer need to waste time and money on multiple copies of the same software or installing upgrades on every PC across the organisation. Moreover, a company with offices in five cities no longer needs to purchase five copies of the software. Further, this Internet architecture eliminates the need for organisations to make investments in expensive and maintenance-intensive technologies to facilitate remote connectivity such as Citrix<sup>®</sup> MetaFrame<sup>™</sup> or Microsoft<sup>®</sup> Terminal Server<sup>™</sup>.

For connected mobile users, such as employees in remote offices that are accessing the application over the Internet or traveling executives working from their hotel rooms, Sage CRM MME's Internet architecture allows secured access through an Internet browser, PDA, or a WAP-enabled device. Alternatively, Sage CRM MME Mobile allows on-line connection from a PDA. A PDA device can be connected to the CRM server, using a physical network connection, wireless LAN, or dial-up connection. To access CRM using a wireless device, a connection needs to be established through a WAP Gateway Provider (typically, local telephone companies) or through an Internet connection via a PDA modem.

For disconnected mobile users, such as field sales persons and support personnel that are accessing the application without connecting to the Internet, Sage CRM MME's Internet architecture allows them to work from a local copy of the central database. Sage CRM MME leverages the underlying synchronisation technology of the database server to synchronise data from disconnected users. Users can synchronise over the LAN, or via the Internet/FTP. Sage CRM MME even synchronises documents from the document library, a central repository of all documents that are exchanged and referenced in CRM.

## Scalability

Sage CRM MME is designed to accommodate change and grow with you. Sage CRM MME is an open system that is built on industry standard technology. By virtue of the unique Internet architecture of Sage CRM MME, companies can manage exponential growth in their businesses, and simultaneously maximise their returns from the application. Its modular implementation provides an evolutionary approach to enterprise applications. Companies can choose to implement <sup>2</sup> Sage CRM MME Standard Edition or <sup>3</sup>Sage CRM MME Advanced Edition. In addition, companies can choose to add the Computer Telephony Integration (CTI)<sup>4</sup> module of Sage CRM MME, providing telephone switch integration for in-bound and out-bound calls within the CRM interface.

Many CRM systems marketed to small and mid-size companies economise by using a two-tier client/server architecture-over simplifying the system by eliminating the server tier and requiring each client to manage its own connection to a database. The lack of a true middle tier means that there is no central distribution of processing and that the database itself must directly support every client. Two-tier deployment models will not scale to a large number of users or to large data transfer requirements. Hence, these models are ill -suited architecture upon which to build robust, scalable, and adaptable solutions. To handle high transaction volume, Sage CRM MME can allow for multiple application servers, potentially running in parallel against the same database. Such multi - tier deployment can spread processing loads across multiple machines, thereby supporting the increased transactional throughput and only requiring the addition of inexpensive PC servers.

Typically, with an increase in the number of users, the performance of a client / server application can degrade. However, Sage CRM MME's Internet architecture relies on thin network implementation, with the average CRM web page being between 5k and 15k (no heavy, proprietary communication traffic between client and server, just HTML). Therefore, a user does not experience degradation in application performance, even when accessing CRM through a low-speed dial-up connection.

Sage CRM MME pools all database connections used to handle incoming requests. Connection pooling enhances the performance of executing commands against a database. Before executing a command on other systems, a

---

<sup>2</sup> **Sage CRM MME Standard Edition (Sales Force Automation and Basic Marketing)** – supports the following components: No upper limit of seats, full customisation, includes Extensibility Module, includes Solo.

<sup>3</sup> **Sage CRM MME Advanced Edition, (Sales, Marketing Campaign Management, Customer Care, Web Self Service)** - supports the following components: No upper limit of seats, full customisation, includes Extensibility Module, includes Solo, includes CTI Connector, includes Web Self Service,

<sup>4</sup> **CTI** is available only with the Advanced Edition of Sage CRM MME.

connection to that database needs to be established. After the command is executed, the connection is broken. Sometimes creating and terminating the connection is more costly in time than executing the command. For this reason, connection pools within CRM are created to keep connections alive. After a connection is created, it is placed in the connection pool. Connections are then used from the pool so that database resources are not required to establish a new connection. Only if all connections in the pool are being used, new connections are created and made available through the pool. These connections are shared amongst all logged on users, eliminating the need to have one open database connection for each user, even when the user isn't currently using the system.

## **Adaptability**

Sage CRM MME provides easy to use customisation tools, so companies can adapt the application to existing and future needs. Sage CRM MME adapts to changing business process flows, and current and emerging technologies, thereby protecting your investment.

Sage CRM MME is built upon customisable, re-usable server side components and services called 'Blocks'. Integration Server Blocks are components of functionality and intelligence that provide multi-level customisation options, such as browser desktop customisation, user-defined fields, custom screens, third-party custom application integration and more, allowing you to quickly adapt CRM to your company's changing business requirements. The Sage CRM MME Integration Server controls how the screens look and how information is displayed. An Application Programming Interface (API) allows Integration Server Blocks functionality and business logic to be leveraged by programmers using the Microsoft<sup>®</sup> Component Object Model<sup>™</sup> (COM), Microsoft<sup>®</sup> Distributed Component Object Model<sup>™</sup> (DCOM), and eXtensible Markup Language (XML).

Sage CRM MME's open API, called the Integration server allows for ease of integration and customisation. The Integration server makes integration, modification and customised implementations easy and cost-effective. Trained users can make frequent and significant functionality changes and additions as their business needs dictate, all without an expensive re-deployment initiative. Integration Server Blocks are grouped into a number of different types.

Customisation is made through a Web interface and stored in a centrally located meta-database<sup>5</sup>. Any changes to the applications, such as the addition of fields or user interface enhancements, are delivered "on the fly" the next time the user connects to Sage CRM MME, essentially eliminating roll-out time associated with providing additional features or enhancements. Further, the CRM development

---

<sup>5</sup> **Meta data** is "data about the database". It describes the structure and meaning of the database. Let us assume, "Leads" is one of database tables in Sage CRM MME and it is modified to include three additional fields. Meta data table will include descriptive and "properties" information about the "Leads" database table object, and characteristics of the three additional fields. Similarly, any changes to data entry screens, lists, drop-downs, field characteristics, etc. are all stored in meta data, within the CRM database.

environment allows seamless re-use of business logic between connected and disconnected applications.

In addition to customising existing built-in Integration Server Blocks, new Integration Server Blocks can be created and deployed. This allows for total flexibility in terms of extending CRM to integrate with legacy systems. Sage CRM MME includes the following Integration Blocks:

User Interface Blocks	All user interfaces that a user sees (menus, screens, entry boxes, grids, buttons, etc.) are derived from User Interface Blocks. They take their definition from properties and events stored in the metadata database and provide entry, display, validation, and database services for easy display and entry of information in a browser. These Blocks support Web and wireless users from a single application. Sage CRM MME generates the appropriate client interface for each user. In a Web environment, these Blocks generate the appropriate HTML and JavaScript, while, in a wireless environment, they generate WML and WMLScript.
Session Management Blocks	Store information about users and user sessions, tracking the action of users, and enabling user preferences and settings.
Database Blocks	Manage access to data, locking, caching, and pooling of database connections. They provide the ability to create a Web-based front-end for legacy systems. Using database Blocks, you can integrate data bi-directionally from other application databases into CRM.
Workflow Blocks	Monitor and execute workflows and escalations.
Graphics Blocks	Generate platform-independent graphics and charts.
Messaging Blocks	Integrate with standard messaging systems including e-mail, SMS and WAP-Push.
Business Blocks	Created to perform or access existing business functions/calculations using COM, DCOM, and XML interfaces.

Sage CRM MME also provides a powerful Web self-service module that gives customer, user, and partner access to a subset of its data through a customised self-service site. Sage CRM MME Web Self-Service is a tool that helps integrate a company's existing corporate Web site with Sage CRM MME application, allowing end-to-end continuity and closed loop marketing integration without the need for a separate system.

Sage CRM MME's Web Self-Service components enable users to view and input data into customised Web pages, showing and updating information most relevant to the team success including communication, transactional, and contact

history. Using self-service tools, a company can allow its customers to selectively interact with the company's client database, thereby freeing up some of its internal resources and allowing the customer to "help themselves."

Sage CRM MME concurrently supports users in multiple languages, regions, time zones, and currencies, all from a single code-base. Even if your users are all in one country, your customers and partners may be more geographically diverse, requiring localised interaction with the centralised data. All captions, lookups, etc. are stored in reference tables and are used to dynamically build Web pages and screens in the users' chosen language. Further, CRM provides multi-lingual support from a single code base and allows users to share a single language-independent database. Multicurrency support allows users to use the system with one or more currencies and run reports in any currency.

### **Automated Workflow**

Sage CRM MME includes built-in workflow functionality. The Sage CRM MME workflow engine routes information such as sales opportunities, support cases, etc., using a comprehensive set of communication options, including escalations, alerts (using e-mail, SMS and pop-up message), and alarms. Workflow in Sage CRM MME is designed specifically to control and direct a communication process. It revolves around the concept of interactions, notifications, reactions, and inter-departmental communications.

Sage CRM MME utilises workflow agents to extend the reach of enterprise applications – allowing employees, customers, and suppliers to access CRM applications whenever and wherever they need them. Using this model, for example, sales people can be alerted to leads immediately allowing them to respond rapidly to customer inquiries. Business executives can receive alerts while they are on the road, allowing them to spot trends and pursue new opportunities as they emerge. Mobile technology brings users a fast, easy to use interface delivering the access that users need on the road.

Sage CRM MME not only ensures rapid routing and dispatching of mobile service workflow agents; it also ensures that all members of an account team receive critical information about the customer – as it happens. Using workflow agents, Sage CRM MME can increase the speed, accuracy, and scope of automated business processes. Workflow items can be routed and completed in less time. Manual processes that occur far away from desks and desktops can also be automated.

### **Rapid Deployment**

Sage CRM MME is easy to deploy, manage, and modify, thus reducing total cost of ownership and implementation. The application is designed with rapid deployment in mind, offering straightforward customisation options and strong integration capabilities.

Many early CRM solutions come from an era of long implementations, where deployment timelines of over a year are common. Today businesses cannot endure such lengthy cycles because of the high expense associated with long implementations, and the changing needs of business over a relatively short time. Moreover, over time a partially deployed CRM application might offer inconsistent and incomplete information to its users, defeating its very purpose of providing a 360-degree view of the company to its customers and a 360-degree view of customers to the company.

## Secure Access

From day one, the architecture of Sage CRM MME was designed for Internet access, and for running securely within a corporate IT security infrastructure. Sage CRM MME is modelled on an n-tier<sup>6</sup> architecture, and each tier includes a number of security mechanisms.

Application level security in Sage CRM MME is based on the supplied user and password. A user's password is encrypted both within the administrative functions in the system, and in the back-end database for maximum security. The System Administrator can change, but not view an existing users password. Functions within the application are available based on user group, user profile, team, and territories and both record-level and field-level security options are available. Additional security is applied to self-service users, such as customers, partners, etc.

Users can access the master system anywhere in the world using a Web browser. If they have a laptop or mobile device and an Internet connection, they can easily synchronise their data with the master system. Security within the Sage CRM MME Integration Server ensures the integrity of user security, system security, data segmentation, and profiles.

Server level security includes NT Challenge/Response, Secure Sockets Layer (SSL) Encryption, and support for Firewalls. SSL encryption secures data sessions with client users. When an SSL session is started, the server sends its public key to the browser. The browser then uses the key to send a randomly generated secret key back to the server in order to have a secret key exchange for that session. When the Web server uses SSL encryption, CRM Self-Service is aware of this. Firewall types supported by CRM include packet filter, proxy server, network address translation (NAT), and state inspection. Sage CRM MME can operate behind a firewall to protect the server, and limit only certain types of interactions to take place.

---

<sup>6</sup> **N-tier** means "Any Number of **Tiers**." The N-Tier model of computing provides the ability to distribute independent components or services over **as many tiers as makes sense** and then link them **dynamically**, in order to provide **unlimited** application flexibility. Programs partitioned into **Tiers** allow each layer or component part to be developed, managed, deployed and enhanced **independently**.

The CRM web based Self-Service option, works with standard Firewall encryption and authentication technology to provide secure Internet access to customers, partners, and prospects. For additional security, the CRM Self-Service server can be physically separated from the CRM server, and a firewall can be setup to further protect the CRM server. Separate customised Integration Blocks can be created in CRM for self-service pages. These Integration Blocks can be completely unique, or they can be based on a relevant Enterprise Block but restricted to show less information. Within a self-service ASP page, a screen can be designed as read-only or editable, restricting what different users can do on the page. User passwords can be allocated at the person or company level.

Database level security ensures that no user has direct access to the database. All database access is performed via the Sage CRM MME DLL. For additional security, this DLL can be configured to access the database using a login with limited access. Once a connection is made to existing legacy systems or line-of-business applications, the user interface can be customised using the same Web-based administration and customisation tools used to customise standard CRM functionality.

Sage CRM MME integrates with Microsoft applications for increased productivity and improved communications. Bi-directional integration with Microsoft® Exchange™ benefits non-CRM users, who use Microsoft® Outlook™ for scheduling and e-mailing, by providing access to view both CRM and Exchange calendaring, task and interaction management functions. This integration allows non-CRM users and CRM Users to interact, removing inter-departmental communication barriers. Users can set up appointments that include both CRM and non-CRM users, and these schedules are reflected on both systems – Microsoft Exchange and Sage CRM MME. Mail merged documents can be created using Microsoft® Word™, and such documents can be stored in CRM for future reference. The Document Library within Sage CRM MME can be used as a central repository for all file types from quotes to contracts, schematics to maps. With a single click of a button, a CRM user has access to all documents relating to sales opportunities, support cases, companies and/or contacts. The user need not search through physical filing cabinets to look for a document while the customer is on the phone. A simple process of dragging and dropping a document can initiate a workflow for document approval and archival purposes for example: company, contact and lead data can be imported in Microsoft® Excel™ format, and CRM reports can be exported in Excel format for further analysis. To integrate with Microsoft applications, CRM uses a COM interface. Because the data flowing into CRM is validated by the Business Logic Services, data integrity is maintained. Mail-merged documents can be e-mailed, printed, or faxed from within the application.

# Typical Configuration for Sage CRM Mid Market Edition

Sage CRM MME can be deployed in Internet and/or intranet environments. A single Sage CRM MME Application Server can serve both Web-based and wireless clients within or outside the firewall.

Figure B illustrates a typical Sage CRM MME configuration (including optional integration to a back-office system and/or external applications).

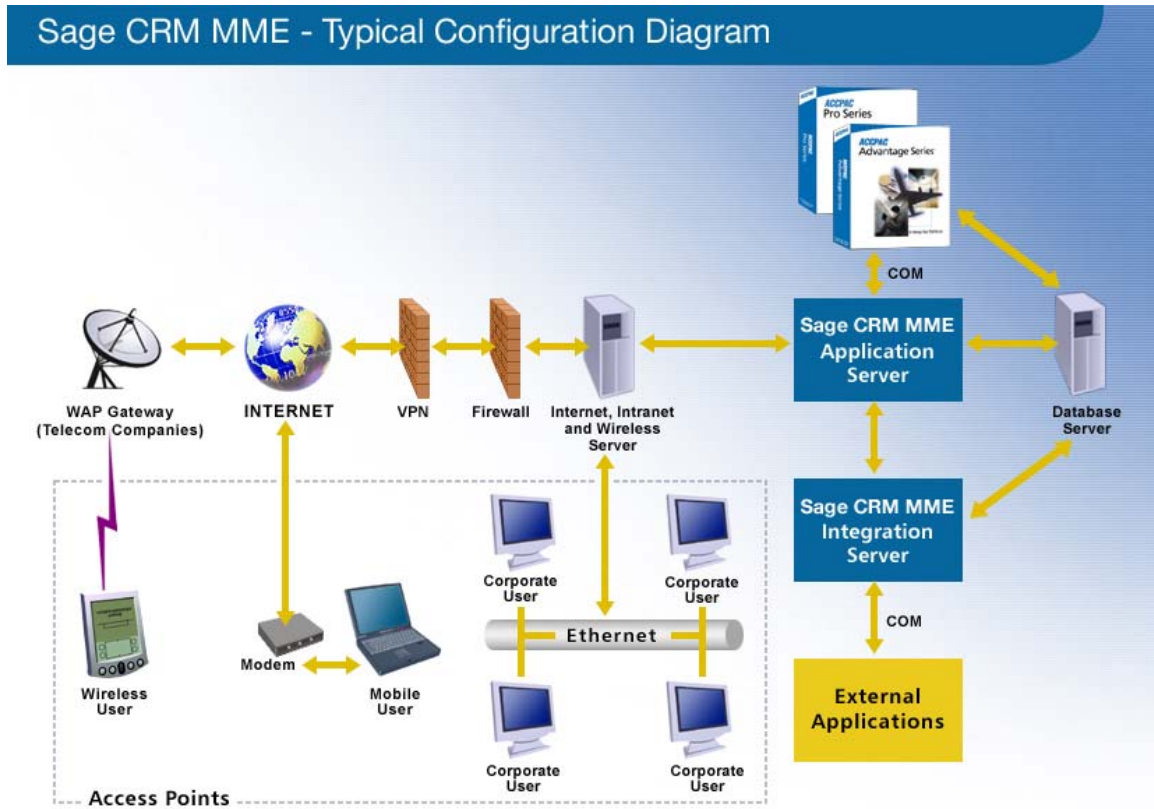


Figure B

## Components of Sage CRM Mid Market Edition Configuration

Web Client	Supports requests from industry standard Web browsers and automatically renders the correct markup language for the requesting browser.
Wireless Client	Supports (Wireless Access Protocol) WAP-enabled and other wireless devices. User Interface Services of Integration Server are used for implementing WAP enablement.
WAP Gateway	Receives requests through gateways operated by Mobile Network Operators and also private Corporate Gateways from suppliers such as Nokia, CMG, and Phone.COM.
Internet/intranet Server	Supports Windows NT/Windows 2000 Server based Web-servers running Internet Information Services (IIS).
SMS Gateway & E-mail Server	Supports workflows with alerts, reminders, notifications and escalations. These can be transmitted to Web clients and/or as SMS messages through any SMTP compliant SMS gateway or as e-mails through a standard SMTP/POP e-mail server.
Database Server	Includes native driver support for Microsoft® SQL Server™ and Oracle.
Network	Supports TCP/IP network on a Local Area Network (LAN), Virtual Private Network (VPN) or Internet.
Application Server	Coordinates with all other components of the application. Includes components from all three layers of the Internet architecture.

## **Closing Comments**

Many CRM solutions are available that provide a unified way to organise, analyse, and understand customer data for customer support, marketing, and sales personnel. Sage CRM MME is at the forefront of technological innovations in the CRM marketplace through its unique Internet architecture, providing uncompromised performance and unparalleled ease of installation, customisation and versatility. Sage CRM MME provides the low cost and ease of installation of turnkey software, with the customisation capabilities of a bespoke solution, allowing companies to implement it quickly and economically, without sacrificing degree of fit or adaptability. It is affordable, not only in terms of the initial purchase price, but also in overall cost of ownership to implement, maintain, update, and expand.

Sage CRM MME offers outstanding end-to-end CRM functionality – from lead generation to sales to support – while providing an architectural foundation unique in the industry, that add value both at installation time and for the lifetime of the business. Investing in Sage CRM MME is a smart business decision that guarantees quick returns and future protection. Sage CRM MME is a vital component of any end-to-end e-business strategy.

