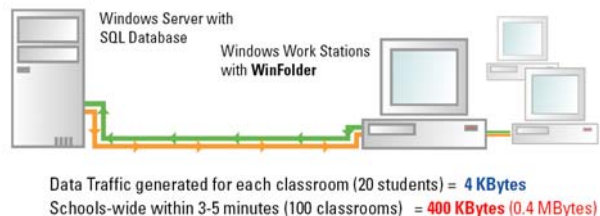


# Bromcom MIS – White Paper

## Background

For many years, Bromcom has been leading the field with “teacher-centric” data capture, direct from the classroom, for pupil attendance, grades, behaviour and communication.

The design and development of these data capturing applications was challenging, bearing in mind that lessons commence simultaneously and teachers log on within seconds of each other for register taking, grade entry and so on. Consequently there is a huge surge of data traffic across the school network in a short space of time. This issue has been successfully resolved by Bromcom with its super-efficient software solution “WinFolder”.



The Bromcom MIS has been developed from the ground-up, to be an end-to-end integrated solution. At its heart is a totally homogeneous database design and framework, supporting web-based MIS software that benefits from the company’s years of experience in the UK education market. Our software architects pulled out all the stops to create the best MIS design whilst keeping efficient data capture intact.

Bromcom has invested over 100 man years of effort over a 3-year period to develop a ‘state of the art’, complete school MIS.

The end result of combining more than 15 years know-how, experience and pioneering technology in data capture and software development is an ultra-modern school MIS dedicated to schools seeking perfection.

## Bromcom MIS System Overview

Bromcom MIS is a Microsoft .NET, predominantly web-based application that runs on the Microsoft Windows 2003 Server operating system with Microsoft SQL Server 2005. It can be hosted in a central location by an Education Authority or a Regional Service Centre. Each school site connects to the application through the Internet or intranet using a standard web browser.

The architecture is designed to scale easily for different-sized implementations without compromising response time or usability. The number of servers and platform software required to host varies depending upon the size of the implementation. A single server will be sufficient for small schools. In larger-scale implementations, multiple servers are recommended, and the web application is separated from the database to allow faster access. Ultimately multiple web servers can communicate with one or more database servers, yielding balanced loads across each server, no matter how large the implementation. In this way the Bromcom MIS can be scaled up to cover large groups of schools and whole LAs.

Some optional parts of the solution have been provided as client installable modules in order to allow offline and/or offsite operation but, where requirements allow, the application is provided via a browser.

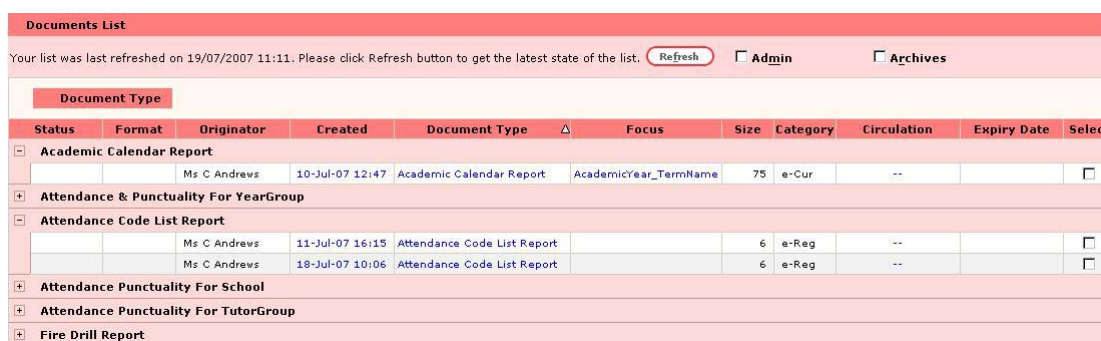
## Common Features – Bromcom MIS Framework

Bromcom MIS Framework is the software structure that is common across all modules and holds the modules together while providing uniformity in appearance and behaviour. This is key in reducing the training required and also ensuring that the software is easy to use.

The following are examples of major features that make the Bromcom MIS stand out in the industry:

### My Reports (Document Management System)

Managers and administrators can not only automatically schedule reports to run whenever they are required; they can also circulate them to others who need access to the information. Reports can be sorted by type, date and focus (e.g. student, class, teacher), quickly and easily using the new intuitive drag-and-drop functionality. 'My Reports' also frees the user to get on with other MIS tasks whilst the system is working on the report in the background – a flag advises when the report is ready



Status	Format	Originator	Created	Document Type	Focus	Size	Category	Circulation	Expiry Date	Select
Academic Calendar Report										
		Ms C Andrews	10-Jul-07 12:47	Academic Calendar Report	AcademicYear_TermName	75	e-Cur	--		<input type="checkbox"/>
Attendance & Punctuality For YearGroup										
Attendance Code List Report										
		Ms C Andrews	11-Jul-07 16:15	Attendance Code List Report		6	e-Reg	--		<input type="checkbox"/>
		Ms C Andrews	18-Jul-07 10:06	Attendance Code List Report		6	e-Reg	--		<input type="checkbox"/>
Attendance Punctuality For School										
Attendance Punctuality For TutorGroup										
Fire Drill Report										

### Multi-year Functionality

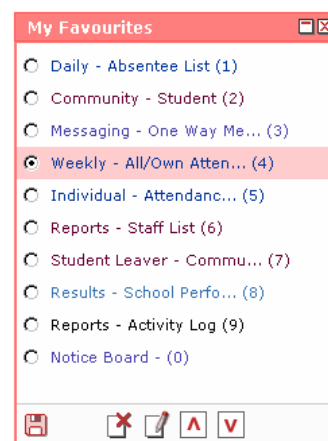
Users can draw comparisons over several years' data instantly via this new functionality. Schools will be able to spot trends and identify pupils who are experiencing problems and deal with them accordingly. Questions like "How many teachers did that Maths class have three years ago?" are answered at a press of a button

### Added Security

Security has always been a priority for Bromcom. The system has always supported domain authentication for quick access from trusted sites now form authentication for 'exposed' locations such as classrooms can be specified, including connections via the curriculum network. The system monitors usage and the administrator is alerted should a user exceed the expected level of access. Do you know how much and what data users of your system have exported? With the Bromcom MIS you will.

### Improved "Favourites"

We led the way with quick links to regularly used functions. Now users can also save the link with all the parameters and settings they normally use with just one click. The list is module-related but each person's "Top 10" favourites are available whilst in any module. Users that regularly report on the same set of classes, tutor groups or individual students can also save these to their Favourite List. Heads of Year can apply their year group to a report with one click, Heads of Department can track performance of all the classes they are responsible for, EWO's can maintain their own watch lists – the system works for each individual user to save them time.



## Bromcom MIS Benefits

- Provides accurate and timely student tracking and reporting using a central .NET-enabled SQL Server database server for all schools, making sure educators have the information they need, when they need it.
- Requires fewer servers to achieve a high level of performance and integration, reducing the hardware investment and total cost of ownership.
- Reduces the need to add network hardware by effectively utilising network capacity, saving money.
- Uses server-side controls, which improve performance and enhance data security.
- Provides teachers and administrators with fast online support of frequently performed tasks through user-friendly intuitive navigation.

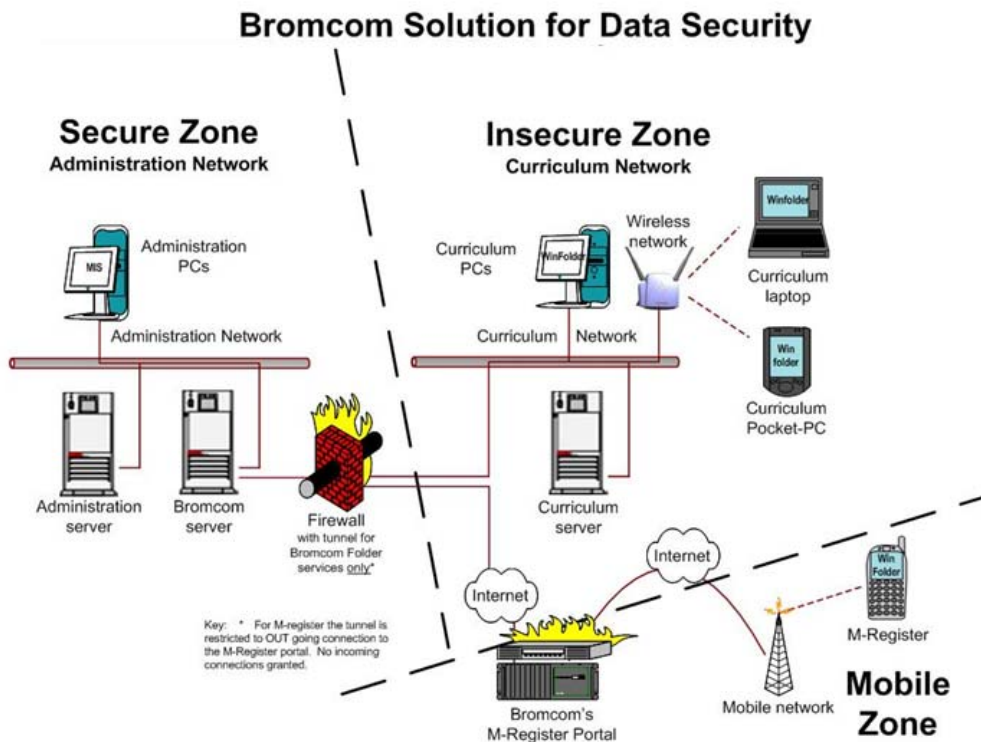
Only optional components require local installation unless used from a central server or Terminal Server

## Bromcom MIS Security

Bromcom MIS uses a future-proofed multiple-level security system. It can be configured for domain or form authentication or a combination of both. The system takes advantage of Windows, .NET and SQL Server security.

The logical and physical architecture of Bromcom MIS ensures end-to-end security, performance, and scalability, leveraging the market's most advanced technology to offer a powerful and cost-effective centralised solution.

This diagram shows a typical configuration for a Bromcom MIS implementation, which includes clients in secure and insecure zones connected to the centralised solution.



## Web-based, Web-enabled and Client/Server School Management Information Systems

Web-based, web-enabled and client/server information systems may appear to be the same in use; however, the differences between the three are fundamental:

**Web-based** Built from the ground up to run over any network (LAN, WAN, Internet) via a browser

**Web-enabled** Written for client/server environments and migrated to enable the client part of the solution to be accessed over a network via a browser

**Client/Server** Developed for client computers, servers, and databases to enable client access from the desktop, via a school Local Area Network (LAN). A server at each school maintains its own onsite database. If the server accesses a consolidated district system, duplicate databases are involved

### A comparison of web-based, web-enabled, and client/server systems

	<b>Web-based</b>	<b>Web-enabled</b>	<b>Client/server</b>
<b>Accessibility</b>	Resides on a web server  The browser is the user interface  Users can access features from anywhere via the Internet	Resides on client computer  Custom user interface  Dedicated connection required to access features	Resides on a client computer  No custom user interface  Client computers do not automatically share data with other computers
<b>Deployment</b>	Occurs only on the server—minimal cost and time to deploy	Occurs on server and clients—higher costs and time to deploy	Occurs on server and clients (on-site)—high costs and time to deploy
<b>Software Updates and Maintenance</b>	Performed at a single location on the server  Clients don't need to be updated  Updates to server are automatically available to users	Can be distributed from a single location  Must download web components and plug-ins for each client  Non-web components must be updated through installation	Must physically visit each location to install/upgrade through a CD  Must install each individual client and the server
<b>Applications</b>	Applications can run on any platform that supports appropriate web browser	Applications must be installed on clients and server  Client applications must be designed for a specific operating system	Same as Web-enabled
<b>Client-side processing</b>	Easy accessibility—familiar user participation Simple, straightforward, easy to use at home and work Minimal training requirements	Users share platform compatible computers Limited accessibility Applications require more training Applications have more client-side processing requirements	Front end (client) and back end (server) application tasks have fundamentally different requirements such as processor speeds, memory, disk speeds and capacities, and input/output devices. Requires more training (client and server)
<b>Infrastructure</b>	Uses existing IT infrastructure—no need for extra hardware and software	Existing infrastructure may need upgrade to meet application need	Hardware intensive—requires a separate server at each location
<b>Bandwidth Utilisation</b>	Low bandwidth, HTTP/HTTPS transactions only	High bandwidth, client processing, security authentication, database traffic	Same as web-enabled
<b>Scalability</b>	Server centric solution, which can be scaled from single institutions to multiple institutions per logical server.  Low cost to add new users to the system	Expensive to increase hardware & software supporting additional users	Limited to adding or removing client workstations (with only a slight performance impact), as well as migrating to larger and faster machines  Expensive to increase hardware and software supporting additional users

<b>Extensibility</b>	Can easily add features/functionality with greater flexibility and convenience promoting a rapid development environment	Does not have the flexibility of Web services technology to add features/functionality with ease	Same as web-enabled
<b>Interoperability</b>	Easy, open integration with other applications due to Web services, .NET technology	More difficult to integrate with other applications due to the client/server nature	Closed systems, difficult to integrate with other applications

## Features and Advantages of the Bromcom MIS Technical Architecture

- Allows for a rapid development cycle and time-to-market, bringing customers new features faster and more easily, and allowing Bromcom to respond more quickly to changing district and school needs.
- Enables educational districts to build on existing technology investments.
- Supports load balancing and clustering across multiple servers to provide high performance and incremental support to districts of any size in a cost-effective manner.
- Supports software- and hardware-based load balancing, enabling users to access the next available server to enhance application performance in a web environment.
- Supports database clustering, RAID disk arrays, and other failover tools using SQL Server Standard and Enterprise editions.
- Requires fewer servers to achieve a high level of performance and integration.
- Supports industry standards such as XML, and .NET Web Services to allow easy integration with other applications.
- Encrypted document management system as repository for all MIS-related documentation, fully integrated into core functionality of the system.
- Patented, secure method of collecting data from the classroom. Extremely low footprint on network bandwidth. Strongly encrypted data.
- Ensures security with a multiple-level security subsystem that takes advantage of built-in .NET and Microsoft SQL Server security.
- Uses business-tier operation authorisation to implement additional security checks.
- Uses data and application level security to ensure users can only access data for which they have been authorised.
- Controls user authorisation for performing tasks only on specific groups of data. For instance, teachers authorised to submit attendance can be restricted to performing this action only for the classes they teach.
- Enables administrators to track security breach attempts with automatic auditing of logon efforts.
- Offers unified single logon authentication and security, allowing users to log on once and access all features for which they are authorised.
- Provides a teacher mark book client that can be used offline from server.
- Ensures maximum performance and efficiency at the browser level with server-side presentation code.
- Server-side and client-side printing.
- Scheduled printing and out-of-hours report generation for regularly used reports based on rolling date parameters.
- Report sharing with other authorised users.
- Export reports to multiple standard formats.
- Additional direct data exports which can be quickly and easily adapted or extended for specific districts' requirements.
- Powerful and customisable search component to find the data that you want. Users can create favourite data selections (single- and multi-select). Single keystroke "Last used" shortcut for each type of data search.
- Customisable system-wide default behaviour for all screens that require parameter entry.
- User favourite shortcuts with customisable defaults.
- Optimised for both frequent and casual operators. Mouse/keyboard or keyboard-only controlled user interface.