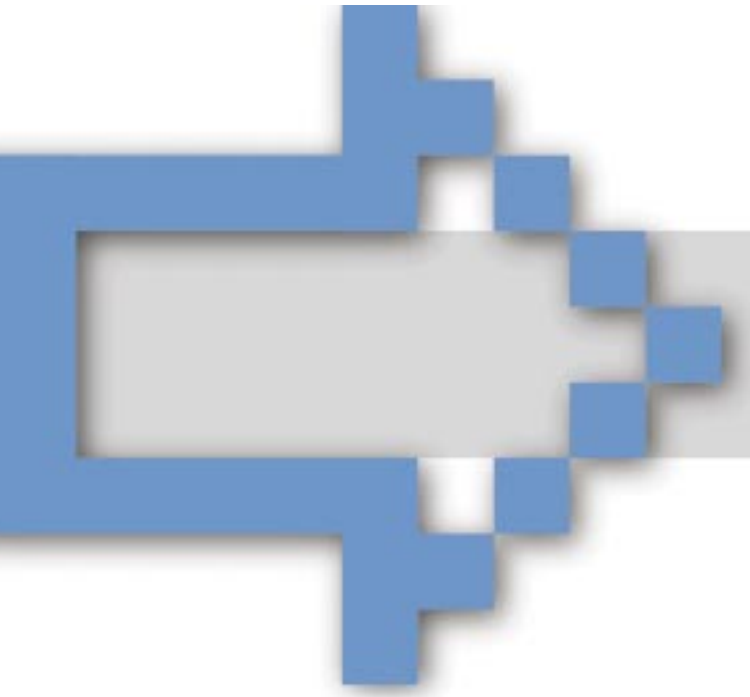
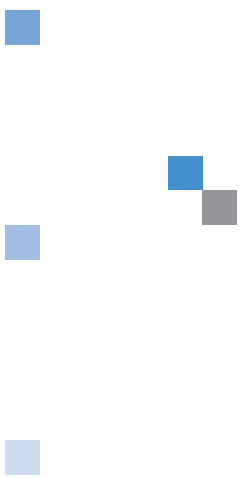


VBA Solutions

White paper

Alterian Component Technology

Building Powerful Data Driven Solutions



Featuring Microsoft® Visual Basic® for Applications

ALTERIAN

Microsoft®

CONTENTS

INTRODUCTION

Alterian Limited is a new innovative software company whose initial suite of data analysis and data mining products revolutionises the way data is stored, captured, analysed and presented. This technology is unique in the way it enables information to be viewed in every dimension and in minute detail, even down to each individual record. It rapidly handles vast quantities of data at the desktop and can be fully customised to meet customers' specific business requirements.

Alterian markets its product suite through an expanding network of business partners, including systems integrators, resellers and marketing services companies. Its component technology has been developed using Microsoft® Visual Basic® for Applications (VBA) which makes it easy for its business partners to integrate Alterian products into their own solutions or customise them to meet the precise requirements of their customers. Using VBA, the Alterian product suite can also be easily linked to other applications, data and legacy systems to create one seamless customer-specific solution.

This white paper examines in detail how Microsoft VBA enhances and compliments the features and capabilities of the Alterian component technology and provides tips on how systems integrators can effectively harness the technology to deliver successful customer implementations.

ALTERIAN PRODUCT SUITE

The Alterian product suite consists of three products designed to meet the different needs of a wide selection of resellers and systems integrators. It has an easy-to-use open architecture that provides flexibility for customisation, easy integration and use of existing skills. All three applications are 32 bit Windows products.

Alterian Nucleus™

Alterian Nucleus is a client/server Analysis Database™ engine developed specifically for rapid analysis of large volumes of data, without the need to pre-aggregate. It processes tens of millions of records per second on a standard PC platform and is supplied with a flexible data import program.

In common with a Relational Database Management System, Alterian Nucleus stores the actual value of every field for every record, but it achieves speeds of analysis usually associated with an Online Analytical Processing engine (OLAP). Any dimension of any record can be analysed - not just those pre-calculated by the OLAP - giving unprecedented power to carry out real world analysis of data.

Alterian Nucleus can be accessed using other products within the Alterian suite or through a standard interface from other applications using its analysis-focussed version of SQL or standard SQL via ODBC. As a Distributed Component Object Model (DCOM) server, it can also be accessed via the Internet as well as over traditional Local Area Networks or Wide Area Networks and from any package supporting ActiveX automation control.

Alterian Molecule™

Alterian Molecule is a rapid application development environment for data analysis. It is designed to allow partners to quickly and easily “snap together” graphical analysis components from Alterian, those written themselves and those available from third parties. This allows them to provide their customers with easy-to-use solutions designed for both expert and novice end users. These include over 50 Alterian components, covering functions such as counting, cross-tabs, charts, maps, data mining and other analysing capabilities. Alterian Molecule is completely customisable in terms of look, feel and functionality to meet the requirements of a particular business application through the use of Microsoft VBA, which is fully integrated with the system.

VISUAL BASIC FOR APPLICATIONS

Microsoft VBA is part of the Visual Basic technology family that includes the Microsoft Visual Basic programming system. This includes the stand-alone Professional Edition and Enterprise Edition, as well as Visual Basic Scripting Edition (VBScript). VBA is Visual Basic technology architected as an embeddable development environment that enables developers to build custom solutions by leveraging the rich functionality of the host application.

VBA is a core component of Microsoft® Office 2000, including Word, Excel, PowerPoint® and Access, as well as Outlook™, Microsoft Project and FrontPage® 2000. It has also been licensed by a wide range of third party software developers, including Alterian.

VBA provides a complete, integrated development environment that includes the Visual Basic for Applications language engine, the Microsoft Forms design tools, a Project Window, a Properties Window, IntelliSense® technology productivity features, object browser, object editor, conditional compilation, automatic syntax checking, improved code security features and debugging tools. It supports a large number of commercially available ActiveX Controls (formerly OLE Controls). These are pre-built, reusable software components that enable developers to easily add rich interactive capabilities to their solutions.

The increasing number of VBA-enabled applications provides opportunities for increased application customisation and integration. This enables developers to leverage their investments in training and knowledge of Visual Basic.

VBA is a technology, as opposed to a product. It offers three vital benefits:

- Enables developers to easily customise applications in order to automate tasks and meet specific business needs;
- Developers can integrate multiple applications with corporate data to quickly create custom solutions;
- Enables companies to leverage an entire infrastructure that has been built around it, including 3.2 million professional developers who already know and use the Visual Basic language.

Alterian Atom™

Alterian Atom is a collaborative application server that allows communities of Alterian Molecule users to share understanding through reports and analysis. It lets Alterian Molecule users share the same view of databases and reports, and distribute these and the results of analysis to each other. With an Alterian Atom server in place, an application can be delivered to many users across many locations - ensuring seamless delivery of information and knowledge while ensuring the necessary security and user privileges.

FEATURES AND CAPABILITIES

The power of Microsoft VBA combines with the core components of Alterian technology to offer significant benefits to business partners and their customers. These key features and capabilities are explained below.

Customisation

Too often business requirements are forced to meet the functionality and presentation of tools, rather than tools being tailored to meet business requirements. To a large extent this has been based on the inflexibility of the tools available. Alterian technology is, designed to allow value added resellers and system integrators to customise its look, feel and functionality to meet exactly the requirements of a client or specific business application. These same facilities are also available to skilled end users in those customers' own organisations that want to be able to provide additional functionality on an ongoing basis without being dependent on external partners.

There are many levels of customisation:

- Alterian Molecule has VBA embedded within it, providing an environment to tailor and customise Alterian Molecule;
- New reports can be built using the snap together ActiveX components supplied, such as queries, chart and grid cross-tabulations, Venn diagrams, comparison & thematic and point plot maps and chi squared automatic interaction detection (CHAID);
- ActiveX components from third party suppliers or specially written for a particular application can be seamlessly integrated (see below).

The Alterian Nucleus functionality is exposed to Alterian Molecule as a set of objects, so that Alterian's partners can extend its functionality. The system can be tailored to lead users through complex processes step-by-step. It is also multi-tasking, in that it allows the user to get on with a train of thought in their analysis, leaving other processes to run in the background.

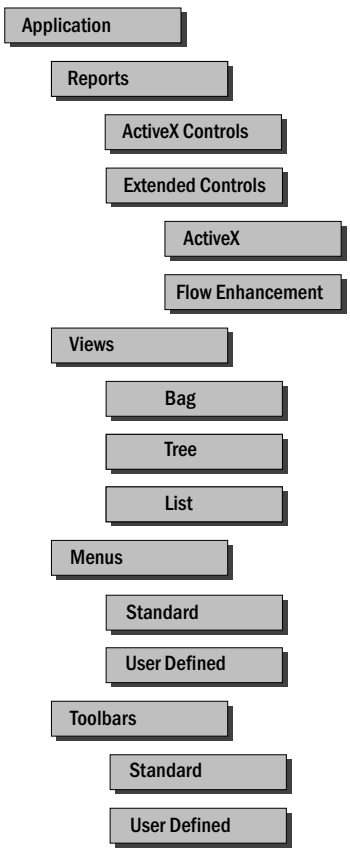
Alterian Molecule provides the flexibility to completely customise the look, feel and operation of the interface, including creating custom toolbars and menus that automate common tasks. It also enables partners to build interactive bespoke reports and allow them to create new wizards that simplify complex processes for end users.

Integration

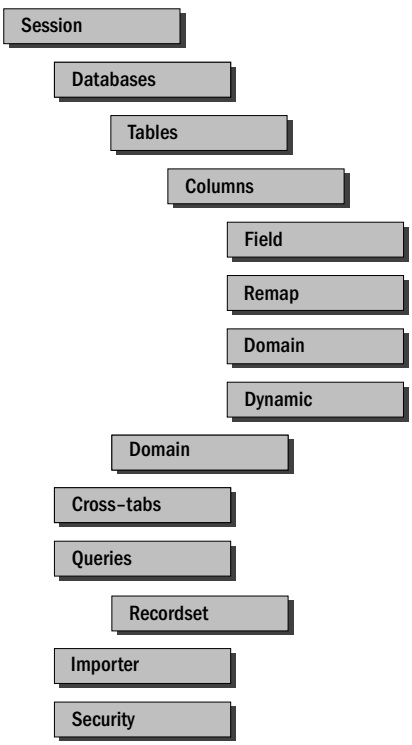
Creating superior solutions to customer problems doesn't just consist of producing application or industry specific versions of Alterian's products. It also involves integrating them with the partner's existing products and the customer's own systems.

Integration of Alterian technology with other packages or legacy systems is a simple process that involves the well-proven mechanism of using ActiveX automation. This is a feature of Microsoft's distributed component object model (DCOM).

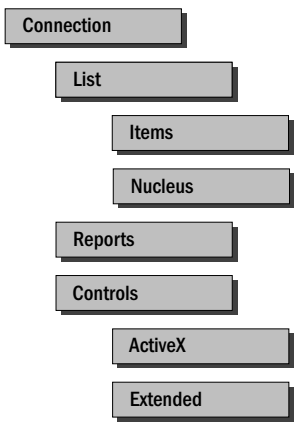
Figure 1.1: Object Model for Alterian Molecule



1.2: Object Model for Alterian Nucleus



1.3: Object Model for Alterian Atom



An object model is a conceptual map or representation of an application's functionality that depicts the hierarchy of the objects exposed by an application. Each object is a discrete, programmable unit of functionality, such as a chart or cross-tabulation. DCOM works natively with Internet technologies like TCP/IP, the Java language, and the HTTP network protocol, providing "object glue" that enables business applications to work across the network and Internet.

DCOM allows Alterian Nucleus and Alterian Atom, Alterian's client/server technology, to be distributed among different servers on the network. As DCOM servers, they can be accessed and controlled by VBA. They work in the same way, whether they are accessed across the network or through a remote dial-in facility. It is highly secure and allows solutions incorporating Alterian Nucleus and Alterian Atom to be used across the Internet as if it were a wide area network.

DCOM is included with Windows NT® 4.0, Windows® 98 and Internet Explorer from version 4.0. It is available for download for Windows® 95 from http://www.microsoft.com/oledev/.

Alterian technology and VBA also integrate seamlessly with the Messaging Application Programming Interface (MAPI) and Open Database Connectivity (ODBC). MAPI gives partners the ability to integrate automatic electronic mail generation and messaging into their applications. For example, an alert can be sent to a user by electronic mail if the value of a calculation indicates a problem. Being able to access data seamlessly from any ODBC compliant data source means that data can be rapidly and easily imported into Alterian Nucleus. Partner solutions can also link to other databases, such as Microsoft® SQL Server™, where this is appropriate for transaction data processing or storage.

Alterian's partners can also add new capabilities to their applications and solutions with the large number of commercially available ActiveX Controls. They can also create their own, using tools such as Microsoft® Visual Basic® or the Microsoft® Visual C++™ development system, that are easily integrated.

Visual Basic, Scripting Edition can also be used to create solutions for Internet and bandwidth-constrained environments. It provides a fully compatible subset of VBA that is optimised for Internet programming and integrates with Microsoft Internet Explorer browser. Please see http://www.microsoft.com/vbscript/ for more information.

Windows 98 and Windows® 2000, the next version of the Windows NT operating system, will support scripting capabilities using a new technology called Windows Scripting Host, a language-independent scripting host for 32-bit Windows platforms. Microsoft will provide both Visual Basic Script and Jscript™ scripting engines as part of these/this operating system(s). Third parties are expected to provide additional ActiveX scripting engines for other languages such as Perl, TCI, REXX and Python. For more information, please visit the Windows Scripting Host Web site at http://www.microsoft.com/products/backoffice/management/WSH.htm.

This capability means that Alterian's partners will be able to use Visual Basic in their operating system, over the Internet using VBScript. They will also be able to use it in their applications using VBA and in their development tools using the Visual Basic programming system.

Infrastructure

Alterian's partners can take advantage of the large infrastructure already in place for Visual Basic, which is fast becoming an industry all of its own. 3.2 million developers are familiar with Visual Basic and there are currently over 85 applications shipping with VBA, with new VBA enabled products shipping every month. A full updated list of VBA partners is available on the Microsoft Visual Basic for Applications Web site at (http://www.microsoft.com/vba/).

A large number of commercially available ActiveX controls have been created and are available for integration into new or existing applications. The available infrastructure also covers a wide range of services, such as training facilities, support centres, books and magazines, seminars, events, trade shows, user groups and web sites.

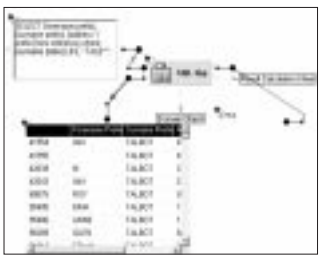
User Interface

It is very important for Alterian's partners to have the ability to tailor the Alterian software to reflect their own user interface. Through the use of VBA, which is embedded into Alterian Molecule, partners can develop and maintain a tailored user interface which matches the exact functionality of their existing products.

Just as importantly, it allows a common "look and feel" that makes the solution appear fully integrated to the user and maintains the partners product branding. This ability to have the exact functionality, look and feel required for the service differentiates them from other providers.

Any ActiveX component can be called from Alterian Molecule. Over 50 analysis and data manipulation components are included as standard in a format which can be snapped together to produce bespoke reports. Partners can also use one of more than 2,500 ActiveX controls already available or write their own bespoke controls for a particular application.

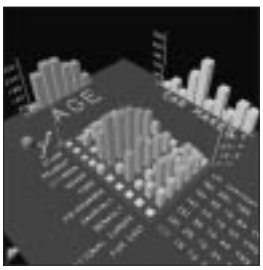
Figure 2: Molecule's snap together interface



Query and Reporting

Alterian technology already includes the ability to resolve complex queries and generate counts, grid & cross-tabulation charts, Venn diagrams, comparison & thematic charts and point & plot maps. The partner can add additional views of data in Alterian Nucleus that are required by their solution. All the underlying components are present to generate the results to feed into these views.

Figure 3: 3-D Cross Tabulation



Analysis tools often require data to be pre-aggregated, such as the sum of the value of sales by department by store by day. When the user requires more detailed analysis, such as the value of sales of fruit at a particular store during a three hour period or the propensity of those buying fruit to also buy skimmed milk, the required data would need to be loaded from the underlying database and indexed. Alterian technology provides access to the data at all levels without the need to re-load or re-index the data. Alterian Molecule interface allows users to construct queries at any level and partners can use VBA to simplify the process as appropriate to their solution or individual client needs.

Data Mining

The latest set of ActiveX components to be made available to partners from within Alterian Molecule is Chi-squared automatic interaction detection (CHAID). This is a data mining technique that automates the identification of relationships between different factors on a data set. The output can be in the form of a tree, list of nodes or a gains chart, giving a powerful representation of individual groups hidden within the underlying data.

These CHAID components can be combined and customised using the integrated VBA to form a specific solution. These could be identifying the reasons for customer attrition (“churn”); identifying the factors driving responsiveness to marketing campaigns; understanding buying behaviour and events; and building strategies for credit management. Many CHAID systems operate on a sample of the data rather than the full data set available. Whilst this is not a disadvantage for many statistical processes, CHAID is a reductive technique, which means that groups are split at each level of the tree. When working on a sample, the data available quickly becomes too sparse to give statistical significance.

Figure 4: CHAID Analysis

By using Alterian Nucleus as a database engine, Alterian’s CHAID components can be run against huge volumes of data, removing the need to use samples that reduce the effectiveness of the model. Operating against databases containing hundreds of millions of records means better models can be built, and the effects of models can be quickly assessed using the appropriate tools connected to it through Alterian Molecule’s integrated VBA.

Environment

The client server DCOM environment provided by Alterian Nucleus and Alterian Atom enables these products to be run on servers at a central location where facilities are in place to manage the data and hardware. Clients gain access remotely using a local area network, wide area network or the Internet. This can be particularly powerful where facilities management is outsourced.

The application server, Alterian Atom, provides collaboration functionality that allows users to share counts, reports, etc. It also manages user access to both functionality and data.

Alterian Atom is already being used by two Alterian partners to host their solutions on their own computers in their own offices. This allows them to manage the database, including the regular updating processes from their clients' machines. Their customers' users are able to access the solution using remote access techniques.

Database Structure

Alterian Nucleus has the ability to handle any form of data, with the exception of binary large objects, which will be included in the functionality of future releases. It can load it rapidly into its analysis-optimised relational format from whatever system it is extracted. It can also load it incrementally, without having to re-load the full data set.

VBA allows partners to create their own special links to the data sources that are used most commonly by their own customers. This can be linked back into the interface to make loading data a simpler process for end users to undertake.

The load time is highly dependent on the nature of the data and the specification of the machine being used to load the data. However, tests have achieved a load and indexing speed in excess of 10 million records per hour on a basic single processor Intel Pentium machine, with each record in the test including name and address information and approximately 140 additional fields of data.

The technical design of Alterian Nucleus allows it to handle 512 tables per database, each containing up to one billion rows. In practice, this is limited by available hardware, but tests of 46 million records each with approximately 150 fields have proved successful on basic single processor Intel Pentium machines and 500 million records have been analysed on a PC with 2 x 200 MHz Pentium processors.

Alterian Nucleus can load additional columns to existing tables, load additional tables and link them to existing tables, append new records or update existing records. Partners can make these changes very easily themselves on behalf of their clients. Alternatively, they can use Alterian Molecule to simplify these processes, making their applications very easy for users to extend themselves. Partners can also build automated loading and updating routines that take data feeds and update the Alterian Nucleus database using script files.

Volumes and Speed

When data volumes grow large, many analysis tools fail to perform at speeds that are fast enough to meet user expectations. Alterian Nucleus is specifically designed to allow real time analysis of hundreds of millions of records, with many thousands of attributes, in several linked tables on a typical desktop personal computer. Alterian Nucleus is designed to optimise exactly this type of analysis, so almost any count or cross-tabulation will be completed in seconds.

This works well as part of a solution created with VBA. They run very fast as VBA operates in the same memory space as Alterian Nucleus and is tightly integrated with it. Distribution of VBA-based solutions is simplified, since the code resides with the application report or project.

VBA itself does not allow multi-tasking operations. However, Alterian Molecule allows components to be run multi-threaded as an event model, which allows VBA to process the results of each step. This enables partners to write a solution that runs any large batch reports in the background, whilst the user continues with his or her train of thought and analysis.

Many applications have a particular type of query or data manipulation that is specific and can be met through SQL or by manipulating objects returned from a database engine which supports this type of interface. However, there will often be an advantage in carrying out all of the processing within the database engine as a new type of function provided by the database. Nucleus allows partners and end users to write these processes as injected Dynamic Link Libraries (DLLs) and run them in process on the Nucleus server. This makes such operations extremely fast as each DLL operates hand-in-hand with Nucleus underneath the COM layer and provides total flexibility.

Communication with Other Packages

VBA can be used from Alterian Molecule to link Alterian Nucleus to powerful industry standard statistical packages, packages such as SPSS and MapInfo, that can also be purchased as ActiveX controls. This enables partners' solutions to generate complex statistical analysis and mapping and carry out more powerful analysis functions where required.

Alterian's technology can both control and be controlled using Microsoft's ActiveX Automation. This enables it to be fully integrated with many other packages such as the partner's existing products and with Microsoft's Office Suite, especially Excel spreadsheets and Word documents for pre-formatted or ad-hoc reports.

Other Alterian partners are producing products based on Alterian technology, such as name and address verification and cleansing functions. These can also be integrated very easily into a partner's total solution.

SUCCESSFUL CUSTOMER IMPLEMENTATIONS

A wide range of successful data analysis solutions have already been built by Alterian's partners using VBA as the customisation environment to tailor the Alterian suite to deliver particular applications or business solutions. These include a campaign management system for a major bank and a marketing profiling system used by a major car company.

Below are a series of recommendations for how systems integrators and business partners can optimise their use of Alterian component technology and VBA to ensure that their implementations meet – and exceed – the demands of the customer, while maximising profit margins.

Consider the Support Perspective

The user interface can be tailored to match a customers own existing solutions to maintain a consistent branded interface. This minimises the support overhead and keeps deployment and user training costs low, because the additional functionality provided by Alterian technology looks and works like the solution they are already used to. It can also be adapted to each customer's specific needs.

Broaden the Mind of the Customer (and your revenue potential)

The flexibility of the technology allows solutions to be extended to new related applications that are not currently envisaged as they arise in the future. This can either be done by extending the functionality already included in the solution or through the seamless integration of existing third party ActiveX controls or additional controls developed in-house.

Take Advantage of Existing Code

Because of the object-oriented programming model (DCOM), on which VBA is based, partners are assembling solutions from objects that have already been written and tested by Microsoft, Alterian and other authors of ActiveX controls. This gives them access to millions of lines of reusable code that speeds up the process of building solutions and so reduces the cost and shortens the development cycle. There is also an immediate code reuse advantage, as the same Visual Basic is used everywhere. This generates competitive advantage by getting solutions to the market faster and at a lower cost.

Appreciate your Competitive Edge

Because VBA is an award-winning development environment, it helps give partners' solutions a competitive edge in product comparisons. In addition, Alterian technology and VBA enable developers to build data analysis solutions that were previously too costly to write, because they leverage existing functionality and integrate easily with other ActiveX components from different vendors.

Make use of Simple Prototypes

The Alterian suite allows developers to rapidly prototype solutions using the interactive development environment. Queries can be quickly executed and manipulated until the correct formula is found. These parts can then be connected together to form a final solution.

Don't Restrict the Ambitious User

Using VBA, the developer can increase the interaction and complexity of the solution making use of additional ActiveX controls and components. Visual Basic code can be assigned to a number of events associated with the report itself or the many ActiveX controls contained in it. Using VBA additional 'User Forms' can provide additional interaction with the user and the suite can be integrated with all of the Microsoft Office applications.

Develop Solutions Rapidly

Molecule enhanced ActiveX controls can be snapped together to form a flow of data between different controls. This is easily achieved by connecting the output data from one control into the data input of another. This operation can either be performed using the Molecule drag-drop interface or using the VBA development environment.

Reuse your Solutions

Reports and ActiveX controls can be used over and over again in many different environments and solutions. The example reports distributed with the suite can be customised and used in customer projects or form the basis of a new design. Once a report is completed, it can be added to any new system.

Give the Customers What They Want

Large amounts of the Molecule front-end can be customised to suit a particular end user requirement. Changing the colour system, adding and removing menu items and toolbars can customise the appearance of the front end. Various windows can be "snapped" to the application to provide the user with custom navigation components or other interface designs.

CONCLUSION

By working together, Alterian technology and VBA enable partners to meet the existing and anticipated needs of their customers for a wide range of advanced data analysis techniques. These solutions work rapidly with high volumes of data using only a typical desktop personal computer. The open architecture provided by VBA, ActiveX, DCOM and other standards enable integration with existing systems, as well as others that provide complimentary functionality. Partners can forget about code generation and concentrate their scarce development resources on the areas that add real customer value to their solutions.