nTegrator

nTegrator: Market Position

A White Paper that describes nTegrator's position in the IT marketspace

[For an introduction to how nTegrator is structured and how it works, see the companion white paper: "nTegrator: An Introduction".]

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Purpose

This white paper is intended for information technology decision makers and influencers who are evaluating rapid application development and integration technologies.
It describes how nTegrator offers the fastest, simplest way to build new and flexible applications that leverage existing information assets.
It explains how solutions based on nTegrator address the various integration challenges that businesses face today.
It provides a clear illustration of how developers and integrators can be significantly more productive using nTegrator, an XML-based enterprise information integration platform, and its top-down solution development methodology.
It is assumed that the reader is familiar with the structure and operation of nTegrator. If this is not so, the companion White Paper "nTegrator: An Introduction" should be read as a prerequisite to this document.

Enterprise Information Requirements

For nearly any company in any industry, deriving intelligence from business data is increasingly crucial to success.

Much of this data is available in operational systems and data warehouses. However data integration is required in order to turn this data into actionable information and deliver it in a manner most useful to end-users. The ad hoc nature of user requirements necessitates a flexible and often real-time solution. nTegrator not only meets this requirement, but it addresses the wealth of data residing outside of operational systems and data warehouses.

Enterprise Information Portal (EIP), Digital Cockpit, Digital Dashboard, Enterprise Information System (EIS), are variations on a common theme: enterprises need to provide timely, accurate, actionable information to a broad spectrum of management and other users.

Such querying and reporting systems are key to sound decision-making, enhancing productivity and efficiency, and identifying areas for revenue enhancement and cost reduction. This type of business intelligence can range from simple reporting against monthly sales data to on-the-fly queries of real-time data for dynamic pricing based on hourly fluctuations in supply and demand.

The Integration Problem

There are many possible types of systems in a typical organization:

- Legacy applications using flat files, mainframe, and other old data storage methods.
- Home-grown applications using Oracle, Sybase, DB2 and other relational systems accessible through standard SQL queries.
- Packaged applications such as SAP, PeopleSoft, Oracle and Siebel, each with their own application layer data calls and query method.
- OLAP, data mining and data warehouse systems, each with potentially different data layouts and access methods.
- Web servers, containing enormous amounts of information in flat files, HTML, XML and other data types.

To provide access to and integration of these systems, in a way that will provide accurate and timely help to management, companies need a system that provides two important components:

- access to heterogeneous data sources; and
- efficient integration and transformation of that data for specific business needs.

Accessing the data is a complex problem. Standards such as SQL, ODBC and other older techniques have failed to keep up with the rapidly changing variety of data sources. Each piece or type of data could be accessed, but merging the disparate sources remains difficult.

When the source was a mainframe or a legacy packaged application, and the destination was internal users on simple terminals, things were easy.

With the advent of web based computing, companies have multiple constituencies demanding relevant real time information to drive critical business operations. For example, a customer needs up-to-date new product information, executives demand real

time visibility of business performance metrics, distributors want to check current inventory and deal with exceptions as they happen.
How to bridge the gap from data sources to the end user is still an open question. To provide tomorrow's enterprise with a solution to the growing complexity requires a new solution for integrating information and presenting it to many stakeholders.

Real Challenges

Integrating information for an enterprise is a challenging job.
IT executives must deal with pressure from the top of the business to deliver results quickly, meet end-user expectations for ease of access to highly diverse data sources, plan around technology limitations, and flex with a constantly changing environment. The primary challenges are around data heterogeneity and duplication, the need for real-time information, and the distributed and dynamic nature of businesses today.

Heterogeneous data

Data heterogeneity is a big part of the data integration challenge.
Data heterogeneity results from the use of a wide variety of information management systems to store data. Each system has its own data structure and access methods. Many legacy systems use non-relational storage, e.g., a hierarchical database such as IBM's IMS. Relational database management systems benefit from the universal acceptance of SQL as the primary means of getting answers. Document and email repositories are generally accessed through text search engines with varying interfaces and capabilities. Because these systems were not designed with interoperability in mind, each must generally be accessed using source-specific applications or APIs.

Duplicate data

Another significant aspect of the data integration problem is inconsistent duplicate data. This lack of concordance is caused by different systems representing the same data in different ways. For example, customers may be identified by name in one database, but by account number in a second database. A third data source, perhaps an email repository, may identify the same customer by email address. And frequently, a required piece of information is derived from multiple data points.
Finding a way to relate the information held in these different information sources is critical if answers that take all three sources into account are to be generated.

Real-time information

Data integration is often challenging because an application requires real-time information.

- It may be a digital dashboard application that a sales manager trying to make quota is using to track sales at the end of the month.
- It may be a supply chain application where decisions about inventory shipments are being made.
- It may be a customer service application where the call center representative is on the phone with the customer and needs to know if the customer's order has shipped.

Multiple divisions and partners

Data integration is further complicated when customers do business with multiple divisions within a large company, or with partners such as dealers and franchisees. Similarly, answering questions about the state of a company's supply chain requires access to vendor and distributor information sources. Doing business electronically across the firewall raises security and data ownership issues.
The challenges inherent in these everyday situations pose the biggest obstacle to the success of today's critical IT initiatives.

Change

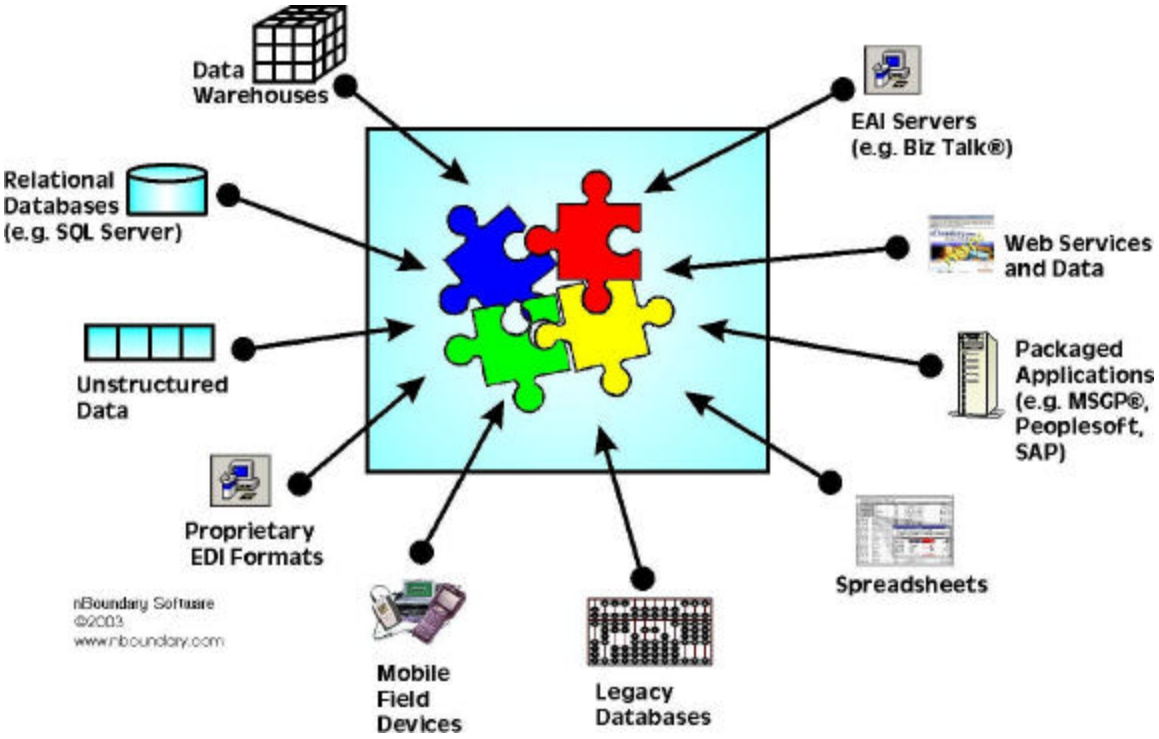
Ongoing change makes the data integration problem continually worse. Change in business requirements, change in IT systems, mergers and acquisitions, new product launches and changing business strategies are some of the changes that can necessitate new data integration efforts or undermine current projects.
This demands that a data integration solution be sufficiently flexible and adaptable to accommodate the certainty of change.

Responsiveness

To effectively react to changes in the business and competitive landscape there is a need to get information quickly and inexpensively.

Localization

Important information is not limited to large-scale databases. Hence there is a need to get data from smaller, more local data sources such as spreadsheets, local databases, handheld devices, etc.



The typical enterprise has many sources of information that require integration.

Traditional Solutions

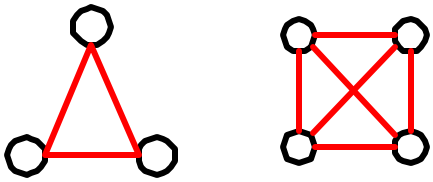
The two most common data integration solutions are point-to-point integration (custom development and EAI) and data warehousing. Both approaches are valid methods of overcoming these obstacles. However, neither is a complete answer.

Custom code development

Custom development is time consuming, expensive, and lacks the flexibility to address new or changing business requirements.

Custom development involves writing an application specifically designed to interact with disparate information sources. Task specific code must be written to access each information source, wherever it is, and reconcile the concordance issues between these information sources.

Adding data sources rapidly multiplies the number of customer-coded links required -, i.e., it takes 3 links to connect 3 data sources, 6 links to connect 4 data sources, 10 links to connect 5 data sources, etc. Once built, these applications are difficult to modify and tend to propagate a mass of code that must be maintained over time, imposing a significant burden on an IT organization.



Three data sources require three links.
Four data sources require six links.

Enterprise Application Integration

One approach that expands on the principles of point-to-point integration is EAI, enterprise application integration.

EAI systems are built around an integration broker, which acts as a hub to route messages between connected applications. This topology can be an improvement over point-to-point integration because it provides a single integration point -- a hub -- for multiple applications.

In addition, EAI systems support transformation and rules-based routing to transport messages between applications.

While EAI bridges the gap between applications via a message infrastructure, it is designed for process integration, not data integration. As such, its capabilities for data integration are limited. In most cases, EAI solutions only provide access to sources one at a time. Today's complex business transactions often require information that is distributed across multiple data sources, and EAI systems do not provide a way to aggregate and process data under those conditions.

An XML-based data integration platform is well suited to complement EAI by providing additional functionality to support complex transactions that require data from multiple data sources.

Data warehousing

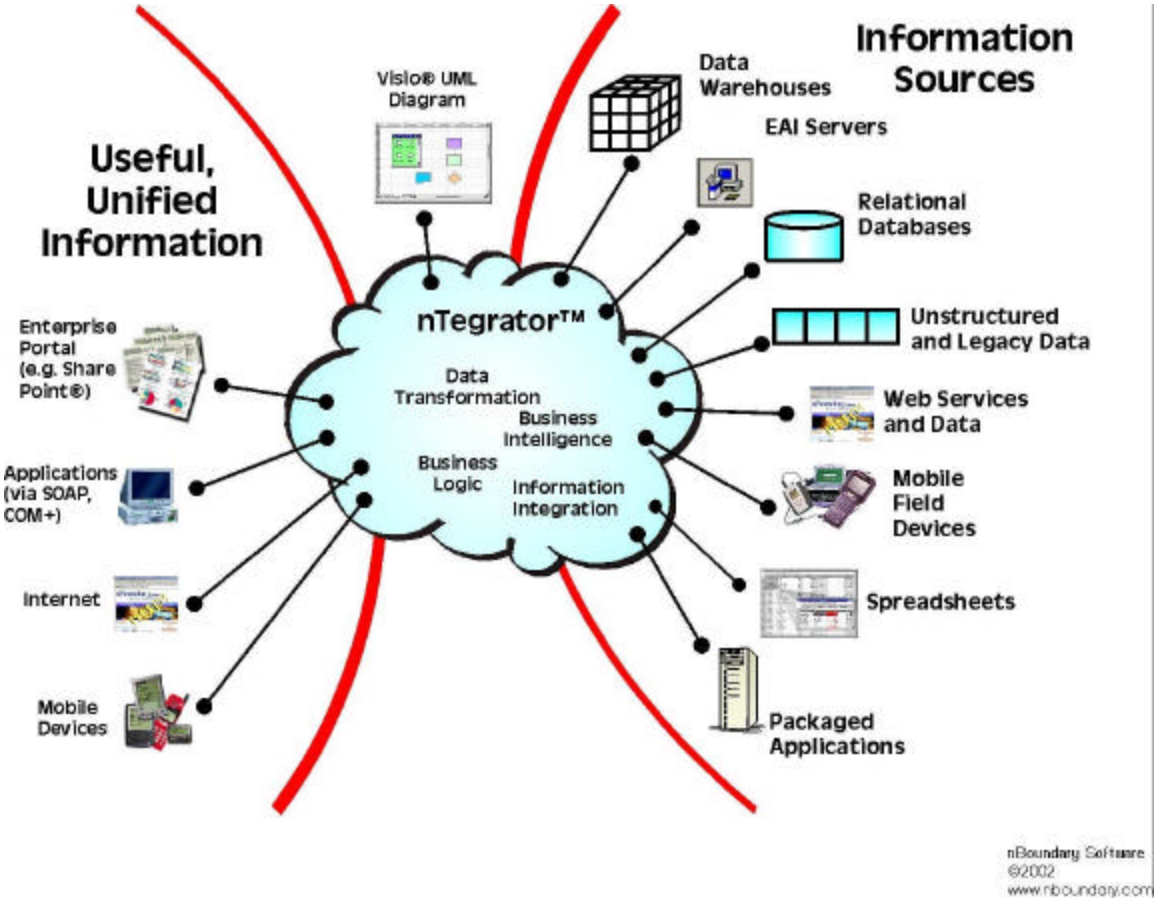
Data warehousing is an important component of an enterprise's data infrastructure.

A data warehouse is an excellent tool to archive data, fulfill regular reporting needs, and do sophisticated data manipulation and analysis such as OLAP (Online Analytical Processing) and data mining.

Data warehousing solves many problems without the limitations of custom development. However, a data warehouse can't readily handle heterogeneous data, applications that must cross the firewall, or applications with real-time requirements.
Data warehouses are large, expensive projects that can't be easily completed in increments to address new and changing business requirements. An enterprise's investment in data warehousing can be greatly leveraged by complementing it with a data integration solution that meets these requirements.

The Solution: nTegrator

nTegrator is software that facilitates rapid application implementation using data in any form, drawn from databases with any structure, from anywhere.
nTegrator can use top-down application definition, top-down design, and top-down implementation. It uses industry standard XML for data manipulation and messaging and has built-in multi-point security. A patent has been applied for the unique way in which the software permits dropping in of new functions without recompilation of code.
nTegrator allows business users to assemble and disassemble business functionality without the intervention of traditional IT organizations.
Today's enterprise architectures are typically a mix of the old and the new, with much effort dedicated to making the two work together. nTegrator applications integrate with one another, are securely exposed over the Web, and are flexible and responsive to changing strategies. They satisfy the continually increasing demand for improved 'abilities' – scalability, interoperability, availability, reliability, manageability. In addition, the applications themselves do more in terms of functionality, incorporating workflow, business process and logic and supporting a range of channels.



Competitive Advantage

nTegrator can be distinguished from the other technologies in two main ways:

- its focus: to provide real-time, seamless access to any data, anywhere, for any application;
- its underlying technology: real-time XML query, data processing, and data delivery optimized for flexible access and efficient data integration.

Depending on each enterprise's unique situation, nTegrator can be applied to perform rapid, high-level data integration either as a standalone solution or within the framework of a larger integration project.

An nTegrator application works over standard web connections to access an array of data sources. It renders results that are automatically referenced and organized for presentation by web applications. As a result, it can be embedded within an integration application rapidly and easily. An upcoming enhancement will allow it to be invoked as a web service.

The viability of nTegrator has been greatly enhanced with the creation of Extensible Markup Language (XML), a format for exchanging data.

nTegrator allows an entirely different approach to integration:

1. Traditional application integration solutions link existing complex applications in to a common infrastructure. The nTegrator approach is designed to allow for smaller, modular functionality that can be assembled and reassembled into business processes
2. Most traditional application integration technologies are designed to form discrete, pre-specified connections. nTegrator enables open-ended, one-to-many connections.
3. The traditional integration approach is an "all or nothing" solution requiring significant commitment of dollars and time resources. nTegrator can be deployed in incremental steps with considerable savings in cost and effort.
4. Unlike most other EAI products, nTegrator does not use a 'hub' model.

nTegrator takes all of the complex integration and middleware products and expertise that have been built up over the last twenty years and boils it down to its most basic and simple form. By taking this simple approach to a complex problem, nTegrator provides a ubiquitous and accessible solution to very large scale integration challenges. The nTegrator approach greatly simplifies the technology barrier to integration.

Traditional Solutions

EII Technologies (like nTegrator) are relatively new. As a result many IT departments have traditionally used other means of providing web applications with rapid access to enterprise and cross-enterprise data. The following table briefly describes these alternatives and their respective applications and shortcomings:

Technology	Definition	Application
Enterprise Application Integration (EAI) Systems	Systems that link disparate enterprise applications such as ERP, SCM, and CRM applications.	Integrate applications at business process level with focus on process-based transaction coordination.
OLAP, Data Mining and Data Warehousing Applications	Systems that deliver business analytics from custom-assembled data warehouses and data marts.	Construct complex data views to support predictive, detailed analysis and reporting on large amounts of replicated data.
Business-to-Business Integration (B2Bi) Systems	Systems that automate point-to-point XML transactions among e-business trading partners.	Help companies migrate from EDI and EAI environments to the web without disrupting existing business practices.
Corporate Portal and Content Aggregation Systems	System that aggregates content for self-service use by customers and employees.	Aggregate bulk content and silos of application data from data sources and transform content for easy consumption by end-users.
Enterprise Information Integration (EII) Systems (e.g. nTegrator)	Systems that access, integrate and unite data from multiple disparate internal and external sources.	Provide unified, real-time XML data access within and through corporate firewalls and drive next-generation business solutions.

Key nTegrator Characteristics

Structure.

nTegrator organizes applications along business-level boundaries rather than technology boundaries. This supports an application's behaviour across all logical layers.

Speed.

nTegrator accelerates development by allowing developers to start working without having to build or wait for architecture, business application developers and architects. This reduces the time and effort needed in maintaining system or business level changes.

Flexibility.

nTegrator adapts quickly to business needs, system changes and emerging technologies by loosely coupling business logic from architecture.

Reuse.

nTegrator allows reuse of development skills across projects. It allows reuse of business components.

Simple Top-Down Methodology

Many of the problems associated with information analysis and integration are due to the "data centric" approach that most software in this area uses. By contrast, an nTegrator solution starts at the top by asking the question "what business problem are we trying to solve" and then developing a top-down solution from there.

In most organizations the first step in solving a business problem is to assign a person the responsibility for developing the solution. This is analogous to delegating the task of coming up with a solution to that person. Depending on the size of the problem, the person may be assigned a staff for assistance and staff members will, in turn, be delegated to solve a particular part of the problem.

The staff members may in turn delegate a portion of their assignment to others, and so on. At each level of delegation (except the last), the responsibility of the person doing the delegating is to integrate the results obtained by the staff to provide the solution to the problem that has been assigned. That solution is passed "up the chain" so that it can be integrated with other solutions at the next higher level.

The development of an nTegrator solution follows the same process. The solution to a business problem is assigned to an nTegrator entity called a Collection. A "staff" can be assigned to this Collection by associating other Collections with it. If these Collections require additional "staff", then Collections can be associated with those as well.

The "staff members" at the very lowest level are called "Data Transports" and their sole responsibility is to access data from some source, whether it is in a database, in a file, on another computer in the enterprise, or located elsewhere on the Internet.

In terms of the people organization analogy, Data Transports and Collections play a similar role to managers in that they have the responsibility to coordinate the activities but not necessarily do the actual work. With nTegrator, one or more small programs, called "Agents", can be assigned to a Collection or a Data Transport to transform data, integrate it with other data, or perform some kind of analysis on the data (i.e., Business Intelligence). The resulting information is passed upwards to the next higher Collection for further integration, transformation, or analysis (or all three) until the highest Collection can provide exactly the information that the business process requires, only that information, and in the format that is needed.

Simply dragging and dropping of standard Collections, Data Transports, and Agents can develop solutions to many business problems. Custom Data Transports or Agents can be developed in VB Script, Java Script, C++, or XSLT. The "development by delegation" process matches that used by the Unified Modeling Language (UML) and off-the-shelf UML tools can be used to design complex nTegrator solutions.

nTegrator – Delivering Application Flexibility

nTegrator provides developers and architects with unprecedented flexibility, configurability and reuse when building, deploying and maintaining applications. Developers using nTegrator benefit from:

- Runtime application navigation management. This gives development teams the power to quickly change their application's navigation flows without programming and without the risk of breaking other areas of their applications.
- Simplified management of business logic (adding, removing, updating, etc.). This manages the order in which business logic is executed, allowing developers to add, delete or modify business logic without changing any code.
- Configurable integration. Components can be reused within and across applications without (extensive/any) programming. Applications can be shared and business logic reused much more easily than previously possible.

nTegrator - Role-Based Integration

"Exactly the information you need and only the information you need"

One of the key benefits of nTegrator is its ability to provide role-based integration. Role-based integration provides a customized interface to a set of information and functionality for a specific set of users. For example, customer service representatives can be presented with an easy to use interface that presents all relevant customer information, regardless of the technology underlying the individual source systems providing the information. Business managers may have an interface for tracking key business metrics. Operational managers would be presented with a different set of functionality including alerts to pagers or cell phones.

XML: The New Language of Data

The industry momentum behind XML has been remarkable, and with good reason. This language provides a common data format that enables information to be transparently managed and shared among applications and over the Internet. It is supported in software from such vendors as Microsoft, Oracle, and Sun Microsystems, and increasingly is being adopted by the enterprise.

XML is ideally suited as a mediator of data in disparate sources for several reasons. It is a vendor-neutral format that allows data to be flexible and self-describing. This makes it easier to match data from disparate sources and develop into a common format. For instance, data on sales may be described by product, by region, by division, by sales-person and so on, supporting accurate and personalized data management and distribution.

XML derives from the same roots as HTML, but while HTML merely displays data, XML defines and structures it.

Notably, XML provides a revolutionary means for companies to leverage data sources unavailable in the past – flat files, Word documents, e-mail, web site catalogs, Excel files and other semi-structured information. Applying XML tags to this content liberates the data for access and integration.

XML is also suitable for data presentation, particularly for representing non-relational data. XML can make data presentation easier, since the hierarchical structure already renders data more understandable and relevant to business users. XML represents data in hierarchical schemas that provide superior flexibility and manageability. Its hierarchical nature also makes it ideal to express data structures in certain legacy mainframe systems such as IBM's IMS.

An nTegrator Application: The Pet Store

The Java Pet Store is a reference implementation of a distributed application according to the J2EE BluePrints maintained by Sun Microsystems.
The Java Pet Store was created by Sun to help developers and architects understand how to use and leverage J2EE technologies, and how J2EE platform components fit together.
Microsoft has implemented their own version (the .NET PetShop) with the same functionality and has published the comparisons.
To illustrate the power and simplicity of developing with nTegrator, the nTegrator technology team has replicated the functionality.

Functionality

It is an online store that sells pets from various suppliers.
The customer has several ways to access the store: Browser, WAP phone, Web Service (SOAP)
Regardless of type of access, the customer can use the following features:

- Help – how to use the store
- Browse
  - Look in various categories of pets
  - Look at pets within a category (place in shopping cart to purchase)
  - Get detailed info on a particular pet
- Checkout - customer wants to purchase contents of shopping cart
- Provide billing and shipping info
- Get confirmed order
- Allow for backordered items
- Pay for order
- Order Information – customer can determine status of backordered items
- Inventory
- Accounting

The Pet Shop

This project was completed using nTegrator in 10 person days and the number of lines of code for the nTegrator solution was significantly less than both J2EE and .NET.

	J2EE	*.NET*	***nTegrator***
User Interface	5891	1881	**1680**
Business Logic	5904	853	**400**
Database	412	684	**78**

nTegrator® for Enterprise Information Integration (EII)

As companies extend decision processes to encompass the complete enterprise, (partners, suppliers, distributors and customers) the number of users demanding up-to-the- minute, mission-critical information across a wide variety of devices has exploded.

At the same time, the number of discrete data sources storing this information has increased exponentially. It is estimated that the typical Fortune 1000 company deploys an average of 48 applications and 14 databases. Add to those the scores of legacy, client-server, and web applications deployed at partner, supplier, distributor and customer sites – all of which hold information vital to the extended enterprise.

Today's real-time enterprise is faced with unprecedented increases in the supply of and demand for mission-critical, just-in-time data. The average company spends the bulk of its application development budget writing programs to link its back-office, front-office, and e-business applications to share critical information for driving the full array of business processes, from customer sales and service to supply-chain management.

These lengthy and costly development projects have significantly slowed the progress of e-business and reduced the potential return on investment for e-business technologies.

Fortunately, a new class of integration software – Enterprise Information Integration (EII) systems – promises to address these issues.

nTegrator: The Business Solution

nTegrator is an advanced Enterprise Information Integration (EII) solution.
For today's businesses, nTegrator leverages the extensible markup language (XML) to provide highly optimized, context-specific, real-time data access and data processing, within and across firewalls, regardless of source location, format, or access protocols. nTegrator replaces pages of code and months of custom, point-to-point data access development work with high-level data access, integration, filtering, transformation, and delivery capabilities that can be written using a familiar query-based approach, in only a few minutes. Unlike custom code, nTegrator returns results that are XML-compliant for easy consumption by web, wireless and other modern applications, thereby eliminating the time and cost of developing presentation-layer code in addition to data integration operations.
By providing a flexible, universal data access layer for any type of application both within and outside of corporate firewalls, nTegrator effectively unlocks "stovepiped" data from within enterprise applications, legacy systems, and web services to make the data available to the full array of corporate applications and users that need it.
Applications that may leverage nTegrator span the range of collaborative e-business systems, from customer self-service portals, sales automation applications, supply chain visibility extranets and other systems. Users often require specific sets of timely, accurate data to drive their business decisions and processes. For example, "How many customers that purchased this product over the last six months also purchased warranties? How many units of this part do all of my Tier 1 suppliers have in stock?"

Business Advantages of nTegrator

As companies move closer to the ideal of the "real-time enterprise," the advantages of providing instant, universal access to corporate data become clear:

More accurate, timely decision-making.

Instant access to the right information can help business managers make better-informed decisions that impact the company's competitive position and bottom line.
nTegrator can make this goal achievable not just within the corporation, but also outside of it through the use of mature web industry standards and advanced data access technologies.

Shorter sales cycles.

By giving sales professionals direct, secure access to information residing both in internal corporate databases as well as in supplier and distribution channel data stores, nTegrator enables companies to create shorter, more effective sales cycles.

Higher quality customer service.

Today's integrated CRM systems strive to knit web site, call center, outbound sales and inbound customer support systems. They have problems, however, in accessing information that is important to the solution if it resides in another system. nTegrator enables these customers and customer service professionals to get that answer whether the information they need is in the company's CRM system, in a legacy back-office system halfway around the world, or in a product information database.

More effective supply chains.

For many corporations, "just in time" manufacturing has arrived, but design and manufacturing engineers, managers, buyers, planners, and quality control personnel still lack true visibility into their supply chain networks.
"How many parts are on order?" "When are they scheduled to arrive?" nTegrator provides a universal data access layer to enable supply chain professionals to answer those questions in real-time.

Tighter partnerships.

Many corporations outsource key functions to strategic partners on the supply side and delegate their sales activities to distribution channel partners. This puts new pressure on corporations to leverage their partnerships more strategically and efficiently.
nTegrator enables tighter, more productive partnerships by providing both in-house and partner managers with key business-critical data when they need it.

nTegrator: Technical Advantages

nTegrator is an integration solution that transparently accesses multiple heterogeneous data sources and delivers the resulting integrated data views as reusable components for web applications, web services, and enterprise applications. An open platform that supports such web standards as XML, SOAP, and UDDI, nTegrator delivers real-time, universal access to critical enterprise and cross-enterprise information regardless of source. Using XML translators, nTegrator can extract and transform data from legacy and client/server applications, e-business applications, relational databases, web services, websites, flat files and XML files, and other data sources, both within and outside of corporate firewalls.

Universal access to the full variety of required data sources

These include legacy, e-business, relational, and enterprise application sources. nTegrator accesses these data sources in real-time and encapsulates them in XML, providing an integrated and unified XML data view for fast, transparent access by any web-based application or service.

Integration and presentation in a single, optimized data layer.

nTegrator performs significant data processing operations to intelligently integrate data from diverse sources and deliver it to requesting web applications and services as easily accessible, fully aggregated data views. To streamline application access even further, nTegrator creates this layer as a meta-data schema rather than replicating the underlying data in a repository or warehouse. This also eliminates the need for cumbersome and high-overhead data synchronization efforts.

A single, high-level interface

Simplicity masks the complexity of underlying data sources. nTegrator provides a familiar query interface to developers and applications; making optimized multi-source data access straightforward, regardless of the number and complexity of the data sources involved.

Access control

Access control provides security across departments and organizations. nTegrator enables developers to assign access rules and security levels to integrated data views. This provides an array of organizations controlled access to data from within deep back-office databases, without compromising corporate business rules or security procedures.

Rapid development and deployment capabilities.

nTegrator replaces months of custom coding with simple, familiar queries. nTegrator allows customers to deploy real-time universal data access solutions in as little as a few weeks.

Real-time data access
nTegrator addresses the need for immediate data directly from the source by providing real-time data access for applications that require it.
Easy integration
Integration with existing enterprise application, EAI, and B2Bi deployments is simple. nTegrator delivers integrated, real-time data views that will soon be callable as web services and can already be embedded into existing applications rapidly and easily. As a result, it can be deployed within the scope of an existing EAI or B2Bi project, or it can provide standalone data integration capabilities.

Conclusion

The potential to access, integrate, and analyze the abundance of data that companies possess is greater today than ever before. That data will continue to grow in volume and complexity. Effectively harnessed, it is an enterprise's most potent weapon; without an effective data integration platform it can be an impediment instead.

An XML-centric data integration platform provides an ideal way to swiftly harness the power of information and extend it to dozens, hundreds, or thousands of users. The nTegrator platform provides a simple yet powerful foundation for data access that extends the value of existing systems and new web services and applications.

nTegrator's use of XML offers compelling possibilities to derive business insight from the untapped reservoirs of structured and unstructured content. Its unification of disparate data stores guarantees access to data that is fresh, accurate, and actionable. nTegrator delivers the power to meet the business needs of today, and the flexibility to meet the business needs of tomorrow.

Until recently, successfully marketing a product like nTegrator would have been difficult, primarily due to the need for education within potential customers. Some of the concepts behind nTegrator are revolutionary in the application development space. Gaining mindshare with the developer community would not have been easy. Many developers love to write code and therefore are reluctant to surrender control of this process to a tool. Today, organizations look for developers with a different philosophy – that heavy manual coding (and bottom-up approach) is a tedious process that only introduces unnecessary time, complexity and potential for errors in development of applications and therefore should be kept to a minimum. With strategic and long-term focus for application development on the organization, comes the realization that a solution like nTegrator will be essential for success.