The Scribe Insight Architecture Overview

TECHNICAL BRIEF

Scribe Insight has been specifically designed to support the effective deployment of a number of market leading business applications including Microsoft Dynamics CRM, Microsoft Dynamics GP, Microsoft Dynamics NAV, Dynamics AX, Salesforce, and SalesLogix. More specifically, Scribe Insight enables customers to quickly and seamlessly integrate these mission critical applications with other applications and data stores in the enterprise. Scribe Insight is the core technology that forms the basis for the migration and integration solutions utilizing a unique and open template model that enables companies to quickly and efficiently configure any data integration or migration to meet their specific needs, all without having to write a single line of code. In short, Scribe is the fastest and most comprehensive way to integrate these applications into the enterprise.
Design Goals

Scribe Insight recognizes that no two customers’ integration requirements are the same...even if they are integrating between the same packaged business applications. Each customer configures their business applications differently and has different requirements for how the integration itself will work. Scribe Insight is designed with one overarching objective; provide low cost, highly functional integration solutions that meet the unique needs of each customer, now and in the future, and that can be deployed within hours or days.

There are five major design pillars of Scribe Insight as follows:

- **No programming required** – the tool must have a graphical user interface that enables business or data analysts (the people that know the issue best) to design and deploy sophisticated integration solutions.
- **A single point of management** – that enables companies to easily support and maintain the integration solution long after it has been deployed.
- **A consistent Adapter model** – that enables the core Insight design environment to view all applications in the same way, while presenting information about each application to the designer that is important to the integration task.
- **Open connectivity** – that enables companies to integrate these core business systems with the wide variety of applications and data stores that are unique to their business.
- **A template model** – that enables the user to quickly assemble reusable integration components and configure them for each deployment’s unique needs. After the initial deployment, required changes in the integration can be accommodated with a simple re-configuration.

Functional Highlights

Scribe Insight provides the essential functionality to address the many integration needs of companies as follows:

- **Change capture and event automation** – The sharing of data and initiation of processes across multiple applications begins when a change is made within any of these applications. Scribe provides the ability to identify these actions and capture these changes simply and easily, all within a single user interface. These changes are then published and an automated, fault tolerant, queue-based process is automatically initiated to apply the changes to the other subscribing applications.

- **Support for varying latency** – Different integration processes are going to have very different latency requirements. For example, in the case of synchronizing data in multiple directions between online applications where real time knowledge is essential, latency should be as close to zero as possible, especially if the frequency of changes to the data is high. In cases where data is being replicated in one direction and the time sensitivity of the data is not high, it may be much more efficient to process these records in large batches during off hours. Scribe Insight provides the ability to dial the latency of individual integration processes up or down depending on the business need.

- **Conflict detection and resolution** – Ownership of shared data is a very important consideration for any business integration scenario. Scribe Insight provides automated, rules-based conflict resolution to ensure that a company’s business rules regarding data ownership are enforced at both the field and record level.
Maintaining relational integrity – The relationships, within applications are maintained by a series of unique primary keys for each record. When the same record (an account record for example) is maintained across different applications, each of the instances of that record will have its own unique primary id. Maintaining a cross reference of these keys for all instances of the record across the applications is critical to ensure the relational integrity of records within each application. For example, in the case where a new address is created in one application, when that address is inserted into another application, the foreign key that identifies the account the address relates to in the source needs to be replaced with the foreign key for the account record in the target to ensure relational integrity in the target. Dynamically maintaining the primary id relationships across applications is essential and is an inherent feature in Scribe Insight.

Duplicate detection and resolution – There is not bigger enemy to user adoption within a CRM application than duplicate records. A user will quickly get frustrated by a CRM application if they have to hunt through a significant number of duplicate records to use the system. The use of “fuzzy” logic to identify matches and avoid the creation of duplicate records during an integration process is an important capability here.

Data mapping and transformation – The most obvious need here is the mapping and translation of data elements across the different applications. Another important requirement is the mapping and cross-referencing of different pick-list values across different applications. For example, one application may have a different set of customer types than another, requiring a “best fit” mapping between the two applications. In many cases, multiple applications have very different database designs requiring some level of structural re-mapping of data. For example, one application may have a flatter design and require that a single object be mapped to multiple objects within another, more normalized target application or vice versa. Object-level mapping, as provided by Scribe Insight, will be required to resolve the design differences between the two.

State management – Many integration process needs to be able to dynamically update the state of records and transactions within each of the applications in real-time. For example, a record that was changed in one application could have a state value of “updated, not yet synchronized” until all other application subscribers to that data have successfully been updated. At that point, the integration process would modify the value of the record to “synchronized”. Scribe Insight maintains state at the end points, keeping users better informed, providing greater fault tolerance to the integration processes, and simplifying the resolution of error conditions.

Security / record ownership – Any integration process should fit within the existing security model of the business applications, taking advantage of the pre-defined roles, permissions, and data ownership. This ensures data access is controlled and data integrity is maintained.

Diagnostics, monitoring, and remediation – Integration of data and business processes across multiple applications involves dependencies on network and application availability as well as the potential for user actions that were not designed into the integration processes. These are two common scenarios that can lead to exceptions and errors in even the best designed integration processes. Having the capability to proactively monitor for exceptions, anomalies, or inconsistent data conditions and raising alerts to administrators when they occur, as Scribe Insight provides, is essential.
Scalability / Reliability – Capabilities like multi-threaded processing and optimized utilization of application APIs are essential to support the high volume data requirements of many customers. Additionally, Scribe Insight provides robust, automated failover for scenarios where the integration processes support time sensitive, mission critical business activities.

Scribe Topology

The following diagram represents the topology of the components of Scribe Insight. The items labeled in blue text represent the five major Scribe Insight components; the Server, Workbench, Console, Adapters, and Templates.

The core components of Scribe Insight are built using the Microsoft Visual Studio development platform for the Windows family of operating systems. The Scribe Server is the core engine that provides connectivity to the various applications, databases, and messaging systems within the integration environment. Communications between the Scribe components and the applications being integrated is provided using the appropriate technology. For example, Scribe Adapters to those applications that supports Web Services, such as Salesforce or Microsoft Dynamics CRM use SOAP while other on-premise APIs are worked with using COM/DCOM.

Scribe Insight is based on a loosely coupled, yet tightly integrated architecture that is highly adaptable to each customer’s unique and constantly changing business environment. For example, each Adapter communicates to the Scribe Server in precisely the same way regardless of the application or database to which it is connecting. This abstraction of the application or database details provides for a highly productive design environment...once a user learns to use the Workbench they can design integrations with a wide variety of applications and data stores. This abstraction also means that templates (representing specific integration processes between applications or databases) are insulated from most changes/updates to the application or database interface. The same template that works with Version X of an application will continue to work with Version Y, requiring no reconfiguration except to accommodate substantive changes in the schema or functionality of that application.

The remainder of this paper will explore each of the five major Scribe components in further detail.
Scribe Server

The Scribe Server is the core of Scribe Insight supported integration processes and facilitates the exchange of data between two or more applications or databases. Since Scribe Insight, in essence, brokers a conversation between these applications and databases, it can support a highly heterogeneous server environment of Windows, Unix, Linux, On Demand Applications, etc... All that it requires is “connection” to these applications via a Windows client, a non-platform specific middleware protocol such as ODBC, via an MSMQ message queue, a public or private Web service.

Underlying the Scribe Server are a number of Windows services designed to monitor and detect events, process messages, raise alerts, and provide an access point for the Scribe Console to the other services. The Scribe Server also includes its own internal database that stores all execution and error logging, persisted integration settings, cross reference tables, and important integration statistics. The Scribe internal database can be configured to support the Microsoft SQL Express database (provided with Scribe Insight) or Microsoft SQL Server.

The Scribe Server also provides for high availability with the unattended failover capability in the Enterprise version. Utilizing failover clusters in Windows Server, a failover instance of the Scribe Server is instantly activated upon any interruption on the primary Server instance as depicted in the diagram below. Since this failover instance utilizes the same shared resources as the primary instance, integration processing seamlessly continues uninterrupted.

Scribe Workbench

The Scribe Workbench provides a rich graphical environment where users design and configure the data mappings and business rules that define the integration solution. All work completed in the Workbench is “saved” in a lightweight file that is referenced by the Scribe Server at run-time. This self-documenting,
metadata driven model allows for easy debugging during the deployment phase and rapid modification as the application environment or business needs change.

The workbench allows you to connect to your applications, define a source result set, configure object-level target processing, and then simply point and click to modify or add data mappings.

One of the key capabilities in the Workbench is the ability to “normalize” source data on the fly as it processed against the target application. In other words, single or multi-row “Source” data can have multiple operations executed per row on "Target" data objects. These operations, referred to as Steps, can be conditionally executed based on user-defined logic, allowing complex, transaction-enabled, multi-object operations.

With the Scribe Workbench, designing complex data transformations is a simple task. The Workbench provides over 150 “Excel-like” functions for data translation including:

- Parsing functions for names and addresses
- Date and time conversions
- String manipulation
- Database and file look-ups for processing synonym values
- Logical if/then/else functions to support conditional processing
In the rare case where there is a need for data transformation beyond what is included in the Workbench, additional functions may be created utilizing COM and simply added to the function list.

The Workbench was designed to support many advanced integration needs beyond data transformation and mapping and includes the following additional capabilities:

- A Test Window that displays the result of processing test data without committing the data to the target system. Users can view the results of data translations and object-level transaction processing for easy and efficient debugging of integration processes.
- Built-in system key cross-reference and management, designed to dynamically maintain data integrity between records across two or more loosely-coupled applications
- Built-in support for foreign key value reference management, designed to dynamically maintain data integrity between related records within an application
- Net change tracking by updating or deleting successfully processed source records or by comparing a source-side update stamp against a variable last run date/time in the source query
- Conflict detection and resolution to support bi-directional data synchronization
- Formula-based lookups for "fuzzy" record matching logic
- Value cross-reference and lookup support
- Automatic data type mismatch resolution
- Transactional support for "Header-Detail" type data sets
- Configuration of target-side commit and rollback
- Rich error handling and logical flow control, including support for user-defined errors
- Rejected row logging to support automated repair and recovery processes

**Scribe Console**

The Scribe Console is a Microsoft Management Console Snap-in that provides the user interface to an array of powerful features used to set-up, organize and manage key aspects of any number of integration processes. The Scribe Console is the main user interface to the capabilities underlying the Scribe Server.

The Console can be installed independently from the Workbench, and can be configured to connect to the Scribe Server using either COM/DCOM technology over a LAN, or a provided SOAP-based Web Service connection hosted by Microsoft IIS.

The Console provides a single point of management for a company’s various integration points, organizing them as discrete units of work or Collaborations. Each Collaboration is a series of related integration processes and instructions for how and when these processes should be automatically executed. Collaborations are organized in a graphical, user-defined tree and can be managed as
independent objects with their own reporting, monitoring, and diagnostic functions. The Console also provides easy access and control of all integration processes running on the system, through controls implemented at the Integration Server level.

At the core of the Console are its sophisticated event management capabilities. The Console allows each company to precisely define the proper latency for each integration process from scheduling batch processes to run on a pre-defined time period...to establishing near real-time polling intervals based on a file drop in a directory or the results of a source-side query...to the real-time processing of messages arriving in an In Queue.

The Scribe Server is built with a modular, multi-threaded architecture that allows for scaling of integration processes, based on the available CPU processing strength. It also features efficient connection sharing to maximize performance, where possible.

Additional capabilities of the Console include:

- Access to the files on the Scribe Server that may need to be moved, copied, renamed, or deleted.
- Automated system monitoring of business level events or integration errors with configurable alerts via e-mail, page and net send notification.
- For those data sources that do not have a built in net change mechanism (including event-based message publishing, time and date stamps for updates, or other forms of update stamps) the Console provides a Query Publisher that compares time-based “snapshots” of a source system and publishes the differences as an XML message.
- Settings to launch an executable file to run before or after an integration process. One example where this pre- or post-execution processing can be useful is the ability to move files into an archive directory after the process is executed.
- On screen editable views of pre-defined queries that can be displayed in chart or lists format.
- User Interface for MSMQ management providing message viewing, moving, copying and deleting
- Review execution history of what processes succeeded or failed including detailed error reporting

**Scribe Adapters**

Scribe Adapters enable Scribe Insight to communicate seamlessly to a variety of applications, databases, messages, and files. Scribe Adapters present rich levels of schema information, which is available through the available application interface (via a “declare” type function in an application API or in a WSDL in the case of Web Services interfaces,) to the Scribe Server and Workbench. This schema information includes object properties and interrelationships as well as detailed field attributes such as labels, data types, lengths, restrictions, and default/picklist values. Combined with the rich features in the Workbench, this information provides for unparalleled control over integration processes and eliminates the “last mile” coding required with other integration tools.
Scribe Adapters are classified in two ways:

**Enterprise Application Adapters** are adapters that have been designed and developed to optimize Insight for use with Scribe targeted CRM and ERP applications including Microsoft Dynamics CRM, Microsoft Dynamics GP, Microsoft Dynamics NAV, Salesforce, and SalesLogix. Key features of these application adapters include:

- The automation of common data loading tasks such as assigning primary ID values, setting default values, and validating input data, and setting object relationships all designed to eliminate run-time errors and provide for greater data integrity.
- Dynamic discovery that presents the unique configuration of each application or database instance to the Scribe Console and Workbench at run-time that adjusts to changes in the application or database schema without requiring recoding or recompiling.
- The seamless integration of application and database error messages to provide detailed exception reporting and handling from the Scribe Console’s single point of management

**Connectivity Adapters** are designed to complement the Enterprise Application Adapters by providing a wide variety of integration options to support connectivity to the varied applications and data stores within each company’s computing environment. The following Connectivity Adapters are available with Scribe Insight to offer a wide range of out of the box connectivity:
- Database – provides direct communication with database tables, views, and stored procedures through ODBC 3.0 or higher and natively to SQL Server. Scribe leverages all of the filtering and querying capability of these databases when employing this approach.
- File – allows for the exchange of flat files or XML documents via a directory or FTP/HTTP location.
- Message Queue – supports the asynchronous exchange of XML messages via an industry standard message queue, email, or integration broker.
- Web Services – enables a robust connection to any SOAP-based Web Service which unlocks the power of the Scribe Insight integration platform for a variety of on premise and cloud-based applications.

A common use of Scribe’s Connectivity Adapters is to support integration between the targeted applications served by Scribe’s Application Adapters and a wide variety of other packaged enterprise applications. These other enterprise applications include: (1) ERP and CRM systems from SAP, Siebel, Oracle (Oracle, Peoplesoft, JD Edwards,) Sage (MAS 90 / 200 / 500,) Epicor, etc., (2) packaged applications that serve a particular niche or vertical market, and (3) custom in-house developed systems.

Scribe provides a number of approaches to integrating with these applications, depending on the business requirements and available technical resources including, but not limited to, the following:

1. **Via Web Services** – As mentioned previously, by utilizing Scribe’s Web Services Adapter, Scribe Insight enables a seamless integration between a variety of on premise and cloud based applications via a Web Service with a SOAP-compliant WSDL. If available, this approach is preferred since it provides higher level validation of business logic ensuring a greater degree of data integrity.

2. **Directly to the database** – This is a simple, straightforward approach if you are migrating from an application or your project is limited to a one-way feed of data from that application. Scribe Insight provides a number of methods to extract “net change” data from the application utilizing this approach.

3. **Via interface tables** – Many applications support a set of interface or staging tables that provide for a safe way to integrate data into that application. After data is passed into the interface tables an application process is initiated that validates the data and applies appropriate application rules. With Scribe Insight, you can write to these tables and initiate the application process automatically.

4. **Via an XML/messaging interface** – Many enterprise applications provide an XML interface that is incorporated into the workflow engine within the application. Using this method, Scribe Insight can publish XML messages into a message queue for real-time integration with the other application. Scribe Insight can also receive XML transactions published by the application’s workflow engine into a message queue in real-time.

5. **Via the application’s API** – Many applications expose a Web Services or COM-based API where transactions can be passed to the application. Data can also be queried via this API. Out of the box, Scribe Insight cannot “natively” integrate with this API, however custom code can be written to convert these calls into an intermediate format. This intermediate format can be an XML message, a flat file, or a record in a database staging table.

Scribe Insight also includes Connectivity Adapters for data migration from/to certain leading desktop applications, including ACT!, Goldmine, and Microsoft Outlook/Exchange.
Scribe Templates

Scribe Templates represent complete or partial data integration or migration processes that have been developed using Scribe Insight technology. Scribe provides a number of these Templates as free downloads from the Scribe Web Community to support the successful deployment of Scribe Insight.

Templates are comprised of the building blocks of a fully functional migration or integration solution as configured with Scribe Insight including:

- Source-side “net change” processes and filtering
- Event and process automation
- Data mappings
- Record matching for updates and duplicate avoidance
- User/owner mappings
- Field ownership and update rules
- System key cross referencing and management
- Connection validation and security
- Data ownership and customizations
- Application customizations
- Transaction management
- Commit and rollback settings
- System monitors and alerts
- Business monitors and alerts

There are two distinct styles of Scribe Templates; Solution Templates and Component Templates.

**Solution Templates** represent a complete, fully functional integration or migration solution between two applications. Examples of these include migration solutions for ACT! into Microsoft Dynamics CRM, SalesLogix, or Salesforce and front to back office integration solutions between Microsoft Dynamics GP and Microsoft Dynamics CRM or Salesforce. Scribe’s unique template model provides “out of the box” functionality for these integration scenarios, built over its industry leading integration tool. Because most customers have business needs unique to them, these standard Templates can be quickly extended and customized utilizing the GUI-based mapping and development environment.

The component architecture of these Solution Templates also enables customers to implement Templates in phases or pick and choose the elements of the Templates that they require. In the front to back office integration example, a customer may not wish to implement order integration initially (or in some cases never) but can still synchronize customer activity (accounts, contacts, invoices) between the two systems. This modularity enables customers to implement an integration solution tailored to their exact needs.

**Component Templates** are starting points for common integration processes used by customers that are implementing an integration solution for which Scribe has not developed a Solution Template.

For example, Scribe provides Templates that integrate customers, products, orders and invoices between a Scribe-developed sample ERP system and Scribe’s targeted CRM applications including Microsoft Dynamics CRM, Salesforce, and SalesLogix. A customer that is looking to integrate one of these applications with their own ERP application, can utilize the appropriate Component Template as a
significant starting point. Typically these Component Templates provide the bulk of the end solution, with the remainder easily configurable with Scribe Insight.

For more information, contact sales@scribesoft.com. Additionally, Scribe’s on-line training curriculum and Web Community, accessible through www.scribesoft.com contains documented best practices resources, enabling customers to take full control of their implementations, now and in the future.
About Scribe Software Corporation
Scribe Software is an established leader of data integration solutions worldwide. With over 1,000 partners, 12,000 customers and 1,200 certified consultants Scribe has proven its ability to deliver cost-effective, reliable solutions that give both its customers and partners a competitive advantage in business today. Scribe’s no coding, graphical user interfaces make configuring and managing integrations in the cloud, on-premise or anywhere in between quick and easy. As a Microsoft President’s Award winner, Scribe had demonstrated expertise in all Microsoft offerings. Additionally, Scribe’s expertise includes Salesforce.com, Oracle, JD Edwards and SAP, among others. Scribe delivers data integration solutions that work. For more information about Scribe please visit www.scribesoft.com.

Scribe Software Corporation
1750 Elm Street
Suite 200
Manchester, NH 03104 USA
Tel: 1.603.622.5109
Fax: 1.603.622.3862

Email: info@scribesoft.com
www.scribesoft.com

About the author
Peter R. Chase is Executive Vice President and founder of Scribe Software Corporation. Scribe is the leading provider of mid-market integration solutions. In his capacity at Scribe, Mr. Chase has advised numerous CRM vendors as they formulated their strategic integration strategies. He has also worked with many Scribe customers to ensure a successful rollout of their enterprise integration solutions.