The Diver Solution™ Technical Overview

A Dimensional Insight White Paper

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Introduction

This white paper provides an overview of Dimensional Insight's flagship product, The Diver Solution™ (Diver), an all-inclusive, end-to-end business intelligence (BI) and information delivery platform. This paper describes the Diver technology and how it is uniquely designed for building and deploying BI solutions, dashboards, and reporting and analytic applications. Diver serves as the foundation for Dimensional Insight's BI platform, our custom BI solutions, and purpose-built applications.

Seeking the 360-Degree View

The over-arching goal of all BI solutions is to provide a 360-degree view of your information to support decision making and organizational effectiveness. All too often, executives and decision makers throughout an organization settle for incomplete data to support their decisions. They cannot wait for all of the data from the disparate internal and external sources to be collected, assembled, and delivered in a meaningful way. Although instinct is often relied upon to bridge the information gap, the useful data often exists somewhere in the organization. However, this useful data is not organized and integrated properly, impeding the timely delivery of real and measurable value to the enterprise. The ideal BI solution enables organizations to integrate and compare data collected from operational systems with information in the data warehouse, legacy data sources, spreadsheets, and flat files — delivering information quickly to end users for fast, insightful reporting and analytics.

The key challenge is effectively accessing and integrating data from these disparate source systems — the data required to gain the 360-degree perspective that supports informed decision making and information delivery. These sources, which include databases of financial and non-financial measures, must be integrated into your BI application without losing data governance, integrity, and the context derived from their supporting detail. Effective data integration, indexing, and aggregating are essential to a BI solution that can deliver the critical business information on a timely basis.

Data Integration, Transformation and Delivery

Unique Capabilities

Diver helps streamline the complex process of data indexation and aggregation — to map and convert the varied source data — and deliver this information to end-users, accurately, flexibly and in the proper context. Diver's comprehensive architecture is organized into the following functional categories: Collection, Assembly and Delivery.

Collection:

The Diver platform supports the entire process of extracting, consolidating and converting data into a streamlined format suitable for delivery to users. Diver's robust Extraction, Transformation, and Loading (ETL) tools extract the data from any source system, aggregate, merge, and transform that data, and apply business rules to load relevant and accurate data. Diver's integrated ETL tools provides quick and easy access

to a multitude of data sources: transactional databases, flat files, ODBC-compliant databases, Microsoft® Excel® spreadsheets and a wide range of proprietary data formats including financial, CRM, ERP, EHR and similar operational systems. Because Diver enables the integration of data from any number of disparate sources, users are able to compare, for example, data collected from transactional systems with information in the data warehouse and legacy data sources or spreadsheets and flat files.

While many other business intelligence vendors require a separate purchase of ETL tools or rely on third party tools to provide data integration capabilities, Diver's ETL tools are an integral and integrated part of Dimensional Insight's BI platform.

Through Diver's integrated set of highly flexible and robust information collection capabilities, the entire reporting and analytics delivery process is automated and data collection and application development efforts are cost-effectively streamlined.

Assembly:

The core of Diver is Dimensional Insight's patented data indexing technology and performance-optimized analytic data Model. Diver employs a unique array-based multidimensional indexing technology to transform large and diverse source data into highly optimized Models, ideal for reporting, analytics and data visualization. All Diver components interact with the Model. By indexing *every* possible inquiry path through the data, regardless of the number of dimensions in a Model or the complexity of calculations being performed, Diver's unique data Model provides rapid, consistent response to analytic queries, reports, dashboards, and visualizations. Through the power and flexibility of the Diver data Model, users can "dive" (a Dimensional Insight term reflecting the broad data navigation flexibility offered by Diver that far exceeds standard drill-down) from any dimension into any other dimension, without extensive understanding of underlying data structures.

The multidimensional data Models created in Diver have a modified star schema structure and use binary approaches for data management. This data management structure eliminates data hierarchies and other navigational constraints present within alternative and traditional BI solutions. This structure reduces the need for the overhead generally required to support a specialized data warehouse or traditional relational or multidimensional On-Line Analytic Processing (OLAP) technologies. Diver's unique data Model and integrated information assembly components minimize and often replace the requirement and the additional expense of creating a data warehouse. Alternatively, for organizations with an existing data warehouse, Diver adds value by leveraging the data warehouse, supporting it like any other source system.

Diver's data Model and strategic use of in-memory technology explains why Diver users experience consistently fast response times, regardless of underlying data volumes.

Delivery:
Diver includes a comprehensive array of interactive information delivery, reporting, dashboards, and analysis functionality that allows users to filter and access additional layers of detail directly — no additional report requests are required. Diver is unique in its ability to allow users to dive in any direction they wish without the limitations of pre-set drill paths or hierarchical constraints found in conventional OLAP tools. Through Diver's comprehensive information delivery capabilities, diving is a simple point-and-click operation: No SQL queries, scripting or programming are required for users to explore and analyze data. This simplicity and flexibility makes Diver easy to learn, speeding adoption rates and accelerating an organization's return on their BI investment and value to the organization.

Diver simplifies the information delivery process, ensuring users are given timely access to business-critical metrics in a format that is meaningful to their specific role while acting as a reliable, centralized information access point. Using Diver's easily customizable interface and visualization capabilities, administrators provide users with dashboards, charts, reports, and views of key performance indicators (KPIs). Diver's dashboards and scorecards accommodate all types of users and "information consumers" regardless of role or form of information access required; from self-service, web-based or mobile report consumers monitoring top-level KPIs to analysts who need to dive through their data to access detailed levels of granularity for more sophisticated analyses. Diver allows organizations to send alerts, emails, and reports to designated recipients, based upon defined business rules. This efficiency saves organizations significant time and resources, and ensures that important information is not lost or overlooked.

Delivering Value

Diver implementations are recognized for overall **lower cost of ownership** and **rapid time-to-value and deployment**. Because of Diver's integrated platform capabilities and flexibility, implementations are extremely rapid relative to traditional BI platform alternatives. Diver's "light footprint" is attributable to three factors: (1) avoiding the cost of additional databases required by conventional OLAP tools, (2) leveraging existing data stores and operational systems, and (3) balancing the amount of data held in memory for maximum performance. Diver does not require the purchase or licensing of an underlying database or costly efforts required to build a data warehouse before value is derived. Conventional OLAP-based BI technologies typically require an underlying database or data warehouse to construct and distribute "data cubes" or a specialized data warehouse, before analytics and reporting is even possible. This hidden cost can present a huge entry barrier for an organization seeking reporting and analytics functionality without the overhead and complexity of traditional BI technologies or specialized analytic applications.

Dimensional Insight's technology and expertise enable us to deliver optimal results, quicker implementations, and cost savings for our customers. New data sources are rapidly added to the environment without adding to the cost of the solution. Adding new users is simple. The number of Diver users can easily expand as deployments grow, distributing the benefits of BI throughout the organization. In a relatively short time, Diver customers begin to enjoy benefits such as increased revenues, significant cost savings, reduced labor hours committed to reporting, better customer connections, successful data-driven decisions on investment targets, streamlined sales processes, etc. By leveraging existing systems as well as avoiding the cost of additional databases, Diver customers enjoy a lower total cost of ownership compared to alternative BI solutions.

By reaching an optimal balance of data held in memory, Diver maximizes system performance which users enjoy in the form of consistently fast response times. Rapid deployment and maximum performance enable users to gain business intelligence and add value to an organization at a faster rate.

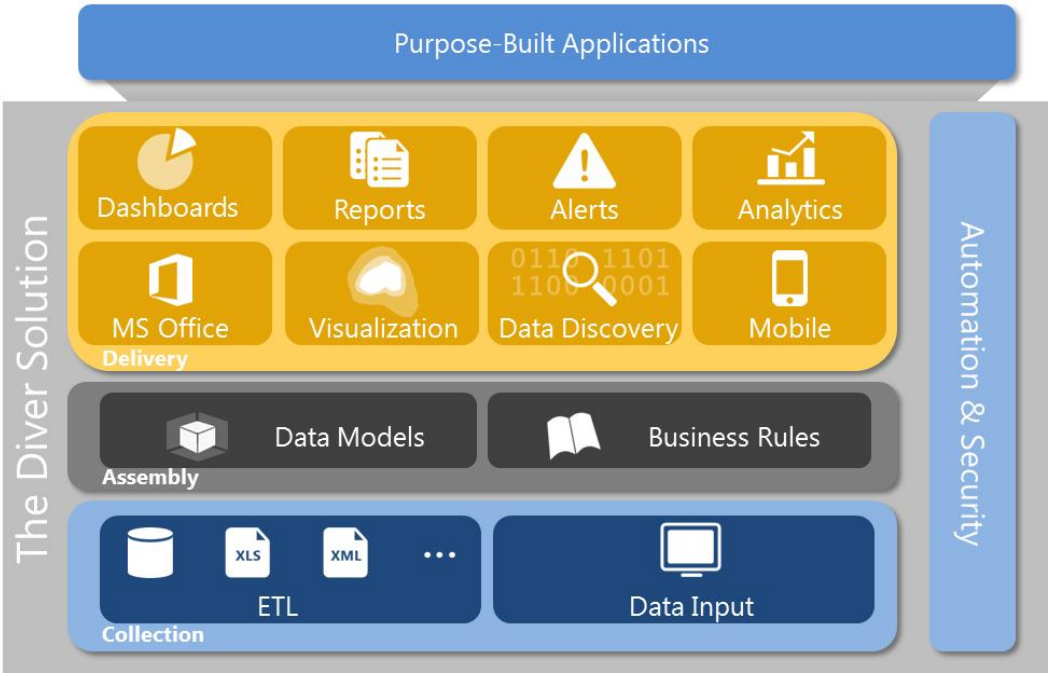
Diver successfully provides time-critical data integration by:

- Streamlining the data collection and application development efforts through full automation and integration of the data collection and delivery processes
- Producing fast analysis response times through a unique data indexing and aggregation approach
- Providing broader access to transactional data via ad hoc queries by eliminating pre-set drill paths or hierarchical constraints
- Leveraging existing systems and minimizing total cost of ownership, and
- Delivering rapid implementations enabling customers to gain value faster.

The Diver Solution — Platform Architecture

The Diver Solution is an integrated set of business intelligence tools and components which serve as the basis for Dimensional Insight's business intelligence platform. Diver includes a powerful server engine that runs on multiple hardware platforms and operating systems, flexible components designed to streamline processes, networked to a choice of intuitive graphical interfaces. In combination, Diver components provide an all-inclusive, end-to-end BI solution (Figure 1). The three functional categories — Collection, Assembly, and Delivery — combine with Automation & Security to represent the comprehensive Diver platform solution.

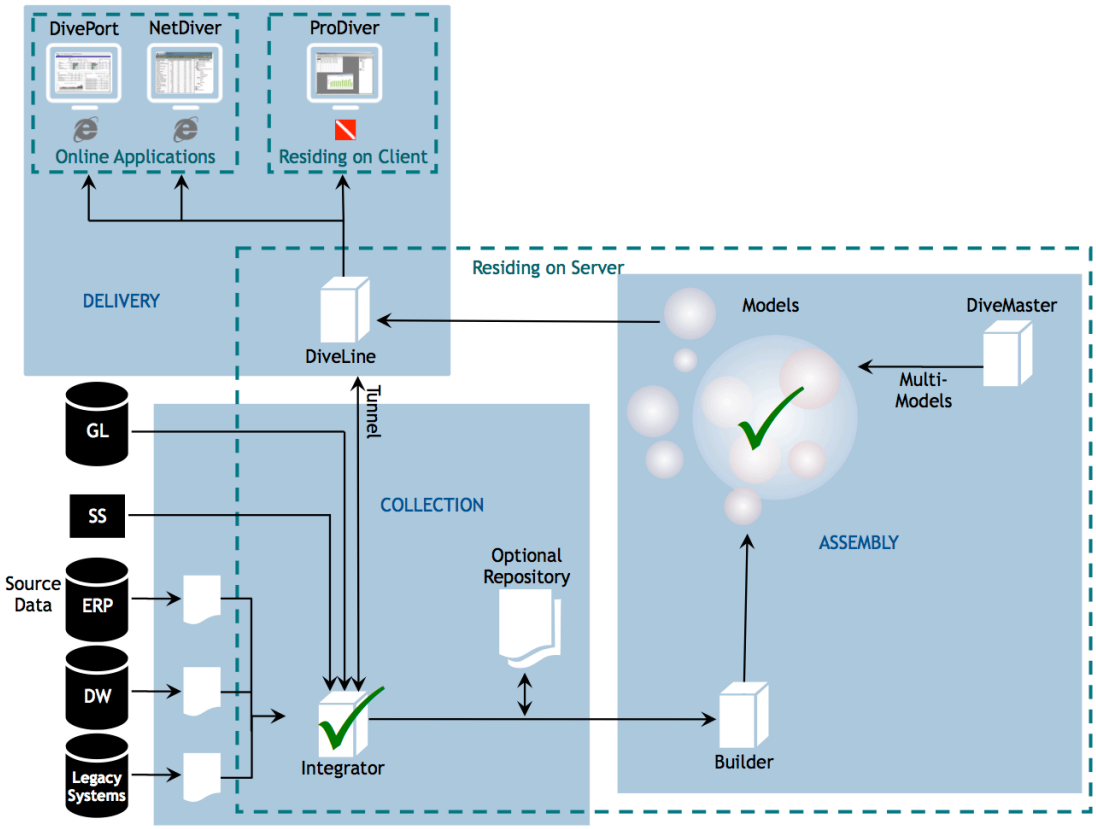
Figure 1: Dimensional Insight's BI Platform Architecture Overview



Data Work Flow

By following a sample work flow of data from its source to its delivery as information to end users, the flexibility and power of the Diver technology becomes clear (Figure 2). This section provides an introduction to some of the Diver components, by name. Additional definitions of the main Diver components are found in the Appendix.

Figure 2: Sample Diver Data Work Flow



Collection:

Beginning with the data's origins: Diver's ETL tool, **Integrator**, accepts inputs from various sources. Integrator is controlled by a script which specifies the data source, the operations to be performed on this data, and where to put the resulting output. Data input is designed to be either "pushed" or "pulled" into Integrator, or a combination of both. IT controls the "push" of source data to Integrator. Diver is responsible for data acquisition with a design to "pull" from the source data as needed. Both of these approaches are supported and both are managed by Integrator.

Diver performs data integrity checks — reading the input data to assess the data contents, its quality and cleanliness, and its integrity.

Integrator accepts input from various sources and combines them to form de-normalized files that are used in Builder, the Diver component that summarizes, indexes, and preprocesses the data to create Diver data Models. An optional repository can store these files, but is not necessary.

Assembly:

Builder extracts data directly from a relational database or accepts the de-normalized files from Integrator and builds multidimensional **Models** based on user specifications. Diver's indexing technology transforms large and diverse source data into highly optimized Models, ideal for reporting, analytics, and data

visualization. Builder designs and builds these Models in “test” mode or in an overnight production environment.

Models are the physical, binary files containing the data stored in the patented, highly-indexed and summarized structure, accessed by the Diver clients. Each Model is designed to accomplish a specific objective. **DiveMaster** is a Windows® client designed to create custom view files that describe how a Model, or multiple Models, should be viewed. DiveMaster joins multiple Models and Lookup tables together into a single virtual Model. In multi-modeling, two or more models with similar structures can be consolidated to save build time. Models with dissimilar structures are managed with Multi-Level Models enabling different levels of detail to be combined in meaningful ways. It is possible to combine Models even if one of the Models to be combined is itself a virtual Model, further expanding the possibilities of gaining insight from complex and disparate data.

Diver performs data integrity checks on the final Model design. If problems are found or specifications change, the developer can loop back to Integrator and/or Builder to make the appropriate changes.

Delivery:
DiveLine is the server component that handles communication and all Model security. DiveLine manages all types of users and their corresponding levels of access to specific Data Models, dimensions, summaries, and info fields.

Tunnel can be used to provide access to dynamic source data such as information in a data warehouse or operational systems. Users can request that data be extracted in real time (typically through an ODBC connection) assuring the most update-to-date information possible.

Diver’s variety of front-end clients (i.e., PC, Web, and tablet) enables users to access their Diver BI solution based upon their unique responsibilities.

Safe & Secure Data Access

All Diver components meet the most stringent security requirements to ensure that data remains safe and private. Integrator accepts inputs from various sources. Data input can be designed to utilize either a push or pull approach, or a combination of both. IT can control the push of source data to Integrator. Diver can be responsible for data acquisition with a design to pull from the source data as needed. Both of these approaches are supported and both can be managed within Integrator.

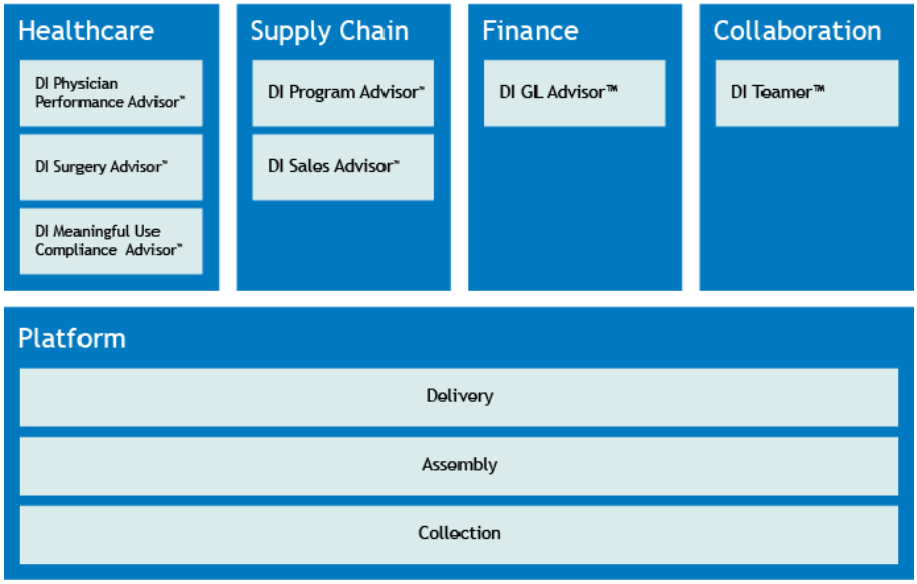
Diver provides enhanced security features and encryption for information that is shared between the client/server module and the client software as well as between the web application clients and end-user browsers and mobile devices. Diver’s security provides safe and secure data access to users wherever they may be. There are five components to Diver’s security structure:

- **User Authentication:** Users can be authenticated via one of four methods, including Dimensional Insight's proprietary configuration protocol, CGI mode, simple bind against LDAP directory server, and System i authentication.
- **Access Control:** Only users who have been authenticated can view data within Diver Models. Customized, role-based data access control can be defined by Model, Dimension, Summary, Access Control List, and user groups. DiveLine enables column-, row-, and cell-level security. Additionally, access control can be set within the DivePort web portal. This controls viewing of web pages and associated content.
- **Password Management and Control:** All levels of users can change their password and administrators have a broad range of options to set password length, expiration, and logon attempts. Diver supports single sign-on authentication and is designed to interface seamlessly with third-party websites and web platforms.
- **Encryption Capabilities:** Diver components use ARCFOUR at 128 bits to encrypt all traffic between the server and the clients. Diffie-Hellman encryption (up to 512 bits) is used for key agreement between the clients and the server. Standard SSL (Secure Socket Layer) protocol is used to encrypt data between the web applications and client browsers.
- **Logging:** DiveLine maintains extensive logs that capture all modifications to user profiles; usage information by user, session, and file; failed login events, and detailed display of data by field and user.

Purpose-Built Applications

Dimensional Insight has developed a family of purpose-built applications (Figure 3) based upon the Diver platform. These applications are the culmination of collaboration with clients and years of experience implementing Diver in the Healthcare, Manufacturing, and Distribution Industries.

Figure 3: Dimensional Insight Applications



DI Physician Performance Advisor™ — allows hospitals to merge their various data sources into one web-based application that automates physician performance reporting and analysis to meet Joint Commission OPPE requirements and drive change with visibility into the details behind the metrics.

DI Surgery Advisor™ — enables Operating Room directors and administrators to measure, monitor, and manage the operational performance of surgical facilities and surgeons practicing at those facilities through timely access to key efficiency, utilization, and quality metrics.

DI Meaningful Use Compliance Advisor™ — is an ONC-certified EHR module that enables hospitals to qualify for incentive payments under the HITECH Act. DI Meaningful Use Compliance Advisor combines robust reporting with unique ad hoc analytics to more rapidly identify Stage 2 improvement opportunities.

DI Program Advisor™ — is an application designed to enable account managers, sales reps, decision and sales support staff to gain self-service access to the information required to manage programs, promotions, incentives, placements and quotas.

DI Sales Advisor™ — is an Apple© iPad®-based sales enablement application that enhances the productivity of an organization's mobile work force. DI Sales Advisor provides executives, managers, and field sales and support teams with self-service access to up-to-date presentations and documents as well as timely brand, customer and inventory metrics whether they are connected or disconnected to the source data.

DI GL Advisor™ — is a revenue and expense analysis and reporting application that enables executives, department heads, and budgeting and planning analysts to quickly access the data necessary to control costs, improve cash flows, and increase productivity.

DI Teamer™ — is an online application providing executives and knowledge workers with an easy way to plan, organize, and collaborate on activities and meetings. DI

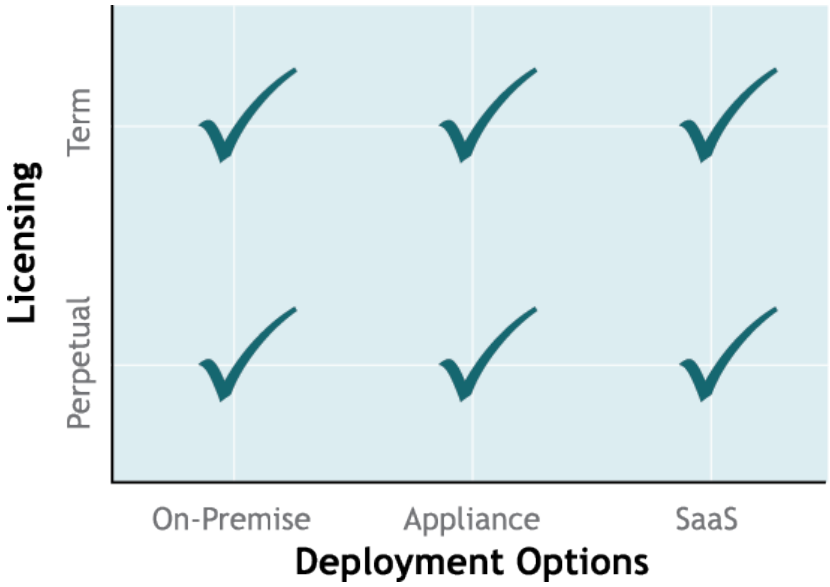
Teamer provides a collaboration system for managing an organization's goals, plans, communication and execution, and metrics.

Flexible Deployment and Hosting Options

Every organization possesses unique installation environment considerations. Dimensional Insight provides a range of deployment options from on-premise installations to hosted Software-as-a-Service (SaaS) implementations and combinations in between (Figure 4). These various options are available under Perpetual or Term licensing agreements.

Diver components do not require a single server environment, and can exist on different machines running different operating systems. Diver deployment is simplified by the fact that it runs on several different server platforms and supports a wide range of hardware platforms and operating systems. Since Diver licensing is user-based, not server-based, there are no limits to the number of servers that can be implemented nor are there limits to the number of instances for each component on any combination of servers.

Figure 4: The Diver Solution's Deployment Options



On-Premise Deployment

In a traditional on-premise Diver deployment, the customer purchases the software and standard maintenance agreement. Dimensional Insight consultants or a Diver-certified partner or distributor help deploy Diver on the customer's servers and create initial Models and applications to customer specification. Maintaining the installation does not require a significant increase in IT personnel, and Dimensional Insight consultants or our network of certified partners are available to answer questions when necessary.

Appliance Deployment

Dimensional Insight also offers appliance deployment — subscription-based access to Diver functionality on a Dimensional Insight-provided server deployed on-premise at a customer site. An appliance deployment often provides shorter implementation times and lower overhead than deployment on a shared server. Under this deployment scenario, Dimensional Insight provides and maintains the servers, eliminating the need for IT resources while keeping the hardware readily available to the customer.

SaaS Deployment

Dimensional Insight was one of the first BI vendors to realize the potential of delivering reporting and analytics using a SaaS platform. **InterReport** is Dimensional Insight's hosted, subscription-based, analytics and reporting service, for browser-based access to the full functionality of Diver. An InterReport SaaS deployment provides shorter implementation times. SaaS deployments eliminate the need to purchase servers and networking bandwidth and offer the convenience of an annual subscription. Dimensional Insight's InterReport hosted services are housed in an ultra-secure data center, ensuring high application availability monitored by a dedicated team of experts without the security issues inherent in many cloud implementations.

Information Delivery Anytime and Anywhere

Executives and information consumers utilize Diver to view and interact with intuitive, visually effective dashboards and analytical reports and scorecards, enabling them to quickly identify positive and negative performance variances. Executives and information consumers can obtain at-a-glance information on KPIs and other critical metrics affecting and reflecting the success of their business units and overall organization.

Diver's full, automated, integrated view of organizational data gives executives, managers, analysts and other information consumers a complete, reliable view of the business and instills confidence in the data shared across the organization. Diver integrates desktop and server data in large volumes and distributes the information instantly to the organization. No matter where users are, information is available quickly and easily. Timely access to a complete view of the business provides executives and information consumers with rapid insight into performance data.

The iPad is rapidly becoming the device of choice for mobile executives and information consumers whose effectiveness increases when their business data and metrics are accessible, quickly and intuitively, anytime and anywhere. Addressing the BI needs of the mobile workforce is **DiveTab**. DiveTab is an iPad-based information delivery platform built on Diver to enhance the effectiveness and productivity of an organization's mobile workforce. Through DiveTab's one-touch intelligent pathing and navigation, mobile users easily access business performance metrics, scorecards, analytic reports and relevant content such as presentations, documents, images and "news." With DiveTab, relevant content is linked to performance data; whether working on-line or disconnected from enterprise BI applications and content management repositories.

Increase Self-Sufficiency

By equipping end users with self-service, ad hoc analysis and reporting capabilities, the need for custom report requests is eliminated. Diver's sophisticated, ad hoc analytical capabilities and time series functionality is accessible to users without requiring them to use scripting languages or perform SQL queries. The end users who understand the data needs of other users become the creators of the new calculations and dashboards to be shared across the organization without reliance on IT.

Diver provides rapid, secure, role-based access to performance data, underlying detail, and related information housed in other systems, empowering its users to gain timely insights into obstacles and opportunities, enabling them to more effectively manage their product line, department, operating unit, or business. The freedom of navigation allows end users to look at any of the KPIs that drive their business in any order. There are no pre-defined hierarchies to limit analysis or reporting options. End users who previously spent a great deal of time verifying data across different systems or spreadsheets are free, in Diver, to focus on discovery and analysis rather than the data integration process.

Minimize the Burden on IT

IT departments within our thousands of customer sites, consistently award Dimensional Insight high rankings for quality of product, quality and value of consulting, quality of tech support, and "buy" recommendations. Diver's favorable reputation within IT departments is due to the benefits delivered directly to IT as well as those delivered to end users that reduce the burden on IT.

Freeing IT

By equipping end users with self-service ad hoc analysis and reporting capabilities, IT is freed from custom report requests.

Data Integration & Automation

With the flexibility to handle data from virtually any source system and the capability to automate the entire reporting and analytics delivery process, Diver ensures the application development efforts are streamlined and cost-effective. Diver technology helps automate the entire process of building, delivering, and maintaining a BI solution. This automated process enables IT professionals to focus their attention on mission-critical projects and tasks. Diver enables users to compare data collected from transactional systems with information in the data warehouse and legacy data sources or spreadsheets and flat files. Through our complex modeling and automation of the delivery process, Diver delivers critical information quickly to enable fast, insightful reporting and analytics.

Commitment to Quality and Development

Dimensional Insight developed all of its technology internally, without outside licensing or acquisition. Therefore, research and development is focused on the creation of new features, enhancements and products that address the needs of our customers. No time is wasted on developing integration paths with products and components from other vendors.

Rapidly Creating Value

The faster Diver gets into the hands of the end users, the sooner organizations can begin gaining insight and making data-driven decisions to improve profitability and productivity. IT appreciates Diver's light footprint and short implementation process which results in a complete BI solution delivered to users in days rather than months or years. Diver eliminates the need for any programming in its set-up and maintenance. Within days, Dimensional Insight's experienced and knowledgeable consultants have Diver installed, interfaced with data sources, and producing reports, scorecards, and dashboards.

From a cost standpoint, Diver delivers innovative BI technology while leveraging existing systems. No additional database is required and Diver is implemented and rolled out without expensive add-ons, third-party tools, consulting fees or hidden licensing costs. With the flexibility of Diver, organizations can evolve and continue to meet their business intelligence needs without having to change products or re-train employees. Diver technology and design enable customers to experience a low total cost of ownership and achieve a rapid return on their investment.

Internationalization

Diver is Unicode-enabled and compatible with data stored in any language. Both single-byte and double-byte environments are supported. The user interface is available in English, French, German, Spanish, Italian, Dutch, Swedish, Portuguese, Japanese, and Chinese (Simplified and Traditional). Through our international network of offices, distributors and partners, Diver is available and supported in North America, South America, Central America, Europe, Asia, Africa, and Australia.

Industry Recognition

Over the years, Dimensional Insight and The Diver Solution have received high rankings from independent analysts and research firms. In its "2012 Wisdom of Crowds BI Market Study," **Dresner Advisory Services, LLC** recognized Dimensional Insight as a top BI vendor for the third consecutive year. In the study, Dimensional Insight consistently outperformed all "Industry Titans" and "Pure-Play" vendors[1] across virtually every

[1] As defined in 2012 Wisdom of Crowds BI Market Study by Dresner Advisory Services, LLC, "Industry Titans" are IBM©/Cognos/SPSS, SAP©/Business Objects, Oracle©, and Microsoft©. "Pure Play" vendors are SAS Institute©, Microstrategy©, Actuate©/BIRT, and Information Builders© (IBI).

metric included in the study. In this particular study, Dimensional Insight scored either at or near the top of all 17 vendor ratings across all aggregate categories including: Value, Product, Technical Support, Consulting, Recommended, and Integrity. Below (Figure 5) is a sample of Product category metrics in this study and Dimensional Insight's scores relative to the other vendor groups.

Figure 5: Sample 2012 Wisdom of Crowds BI Market Study Results[2]

Sample Comparison Metrics:	Dimensional Insight		Other Vendors			
			Industry Titans	Pure-Play	High Growth	Emerging
	Rank (1-17)	Score (out of 5)	Average Scores			
Overall Score	3	4.5	3.5	4.0	4.3	4.3
Recommend	1	5.0	4.1	4.4	4.9	4.8
Completeness of Functionality	1	4.3	3.5	4.0	4.1	3.9
Reliability of Technology	2	4.4	3.6	4.1	4.2	4.1
Scalability	1	4.4	3.6	4.2	4.2	4.1
Integration of Components within Products	2	4.4	3.3	4.0	4.2	4.0
Overall Usability	3	4.4	3.5	4.0	4.4	4.1
Ease of Administration	3	4.3	3.3	3.7	4.3	4.0
Customization & Extensibility	2	4.3	3.3	3.7	4.0	4.1
Ease of Upgrade/Migration to New Versions	3	4.3	3.3	3.4	4.3	3.9

In October 2012, Dimensional Insight ranked #1 in 13 categories and a leader in numerous additional categories of "The BI Survey 12," one of the world's largest ratings of BI providers. The survey, issued by the **Business Application Research Center (BARC)**, a leading independent software industry analyst, is in its twelfth year and features submissions from almost 3,000 business intelligence end users, analyzing 27 different BI products. Below is a synopsis of the category evaluations in which Diver received the top score.

- **Cloud BI** — Dimensional Insight has delivered secure, on-demand BI since 2003, providing customers with flexible, scalable, and cost-effective deployment options.
- **Big Data and Data Volumes** — Patented data indexing and aggregation technology provides users with a unique, interactive environment in which to efficiently and effectively understand their data regardless of volume or complexity.
- **Innovation and Functional Scope** — Diver incorporates a number of novel data analysis and visualization technologies that provide end users with faster time to insight and greater business value. Diver ranked first in Functional Scope among Visual Analysis and Data Discover vendors as well as among Dashboard vendors.
- **Business Benefits Achieved and Business Achievement** — Diver delivers significant, quantifiable business benefits.
- **Query Performance and Performance** — Customers gain immediate insight into complex data relationships and find answers to business questions within seconds directly from interactive dashboards.
- **Self-Service** — Self-service dashboards, reporting tools, and analytical clients

[2] Source: 2012 Wisdom of Crowds BI Market Study developed by Dresner Advisory Services, LLC. Other Vendors Average Scores have been derived from the report.

underscore Dimensional Insight's customer centric approach to business intelligence and scalable information delivery.

Diver was also named "Best in KLAS for Business Intelligence/Reporting" in 2012, for the fourth year in a row by independent healthcare research firm, **KLAS Research**. Over two decades, Dimensional Insight has worked with hundreds of hospitals across the US to harness data from multiple systems into interactive reports, dashboards, scorecards, and analytical tools. Clinical, quality, operations, and financial departments rely on the resulting timely access to data to drive improvements. The flexibility inherent in Diver's architecture allows hospitals to implement BI initiatives faster, more flexibly, and more cost effectively than competing solutions. Many hospitals design their dashboards and interactive reports or use Diver's analytical tool to tackle productivity, quality, revenue cycle, and clinical challenges on their own.

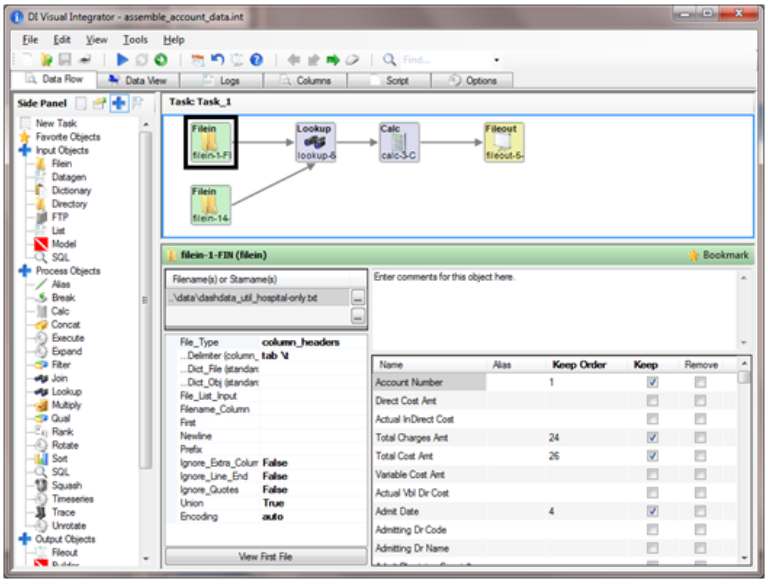
Summary

The Diver Solution is an all-inclusive and integrated, end-to-end business intelligence and information delivery platform and is uniquely designed for building and deploying BI solutions, dashboards, and reporting and analytic applications. Diver technology also serves as the foundation for Dimensional Insight's BI platform, our custom BI solutions, and purpose-built applications. Diver's unique data integration technology, data aggregation approach, and visualization capabilities make it ideal for building and deploying customized BI solutions, dashboards, and reporting and analytic applications.

Appendix — Diver Components

Each Diver component fulfills a specific role in the overall solution, organized functionally and for description purposes here into Collection, Assembly, and Delivery. Diver components do not require a single server environment, and can exist on different machines (including virtual machines) running different operating systems.

Figure 6: Integrator



Collection:

The **Integrator** (Figure 6) is our robust, object-oriented ETL tool that contains a large suite of powerful data manipulation functions including joins, Lookup tables, and filters. The Integrator manipulates and integrates flat files and/or relational database queries from disparate sources. Integrator provides quick and easy access to a multitude of data sources; performs data mapping, de-duplication, cleaning, and merge tasks; and returns a single de-normalized file ready for data Model construction. Integrator can also be utilized as a standalone ETL tool; performing the functionality described above and writing to databases not associated with the Diver implementation. The Integrator is available in a GUI (Graphical User Interface) development environment that manages the preparation and organization of scripts and macros. With Integrator, users define data integration work flows using graphical objects, letting the application create the underlying script syntax.

During the Collection process, the incoming data is reviewed in order to assess the data contents, its quality and cleanliness, and its integrity; all vital elements of the ultimate Model design.

Assembly:

Builder summarizes, indexes and preprocesses the data in order to create Diver data Models. The Diver data Model is composed of Dimensions, Summaries, and Info Fields. Dimensions are generally the alphanumeric data elements, while Summaries are the numerical elements in the data sets. Info Fields are the additional items of information directly related to Dimension values. Builder accepts Integrator output files, ODBC

compliant data feeds, as well as any extract from a data warehouse, relational database or legacy system. Using Dimensional Insight's patented cross-indexing technology, Builder transforms the input data stream into a multidimensional data Model that is optimized for query, analysis, and reporting purposes.

Because of the unique construction of these data Models, Diver has less work to perform as users report and analyze data, thus speeding response time to data queries.

Domain Editor is a component designed to make the initial phases of assembly easier by simplifying the data relationship discovery phase of Diver. Domain Editor uses the standard Dimensional Insight data directory structure to place Integrator programs and Builder description files in a project container called a Domain. It facilitates the creation of programs used for extraction, joining, and description files.

DiveMaster is a component designed to create custom files which describe how a Model, or multiple Models, should be viewed. DiveMaster joins multiple Models and Lookup tables together into a single virtual Model. Because not every number can be summed at the transaction level, Models within Models allow more complex calculations, mapping and indexing to gain further insight from the data. In this way, data from disparate sources can be combined for analysis by finding their common dimension or dimensions, i.e., combining a sales invoice Model with an inventory Model. In this example, these source data are normally used for separate purposes but they share one common dimension of Product. By combining the two models in a virtual Model, the overlapping data can be analyzed to gain sales and product management insights.

During Assembly, the final Model design is reviewed and the data relationships established in Integrator are verified. At implementation and often over time, as new data requirements emerge, Model building is an iterative process. If new Model requirements are defined, the developer can loop back to Integrator and/or Builder to make the appropriate changes. This feature enhances the Model building process and results in better Models, derived faster.

A **DivePlan**, created by DiveMaster, specifies how a Model or several Models should be presented to the user and contains information such as how to combine multiple Models, how to set up Categories, and how to apply and use Lookup tables and Lookup Models.

Scheduler allows an administrator to automate events, such as running Integrator programs, launching Builder to create and update Models, or generating and sending reports. Scheduler assists in optimizing system resources and server performance, ensuring the data Model is up-to-date with critical data.

Delivery:

Dashboards

Diver's dashboard design environment offers maximum versatility in the creation of interactive, intuitive, and visually effective dashboards. Dashboards can be quickly

deployed to collaborate across the organization and with key customers, partners, suppliers or other stakeholders by bringing disparate data sources together into a single view. Users can interact with data by viewing top-level KPIs relevant to their functional area or access underlying detail data in any of the dashboard's charts, gauges, or report views. Diver's dashboard capabilities assist organizations by identifying, defining, and developing metrics that meet project, departmental or organizational information requirements. With Diver's dashboards, users are able to interact with the appropriate data to make fact-based decisions quickly and easily.

DivePort is Diver's web portal, providing an information delivery system designed to be the entry point to all of the reporting and analytic capabilities of Diver. DivePort is also Diver's custom dashboard creation component comprised of portlets dedicated to design and construct dashboards, support data visualization, incorporate external content, and facilitate administration.

Analytics

Diver's unique ability to allow users to dive into the data in any direction enables them to analyze performance at various levels, explore variances and gain answers to their own questions as they arise.

ProDiver is a data visualization, analysis and reporting component designed to provide a powerful interactive interface to multidimensional data. ProDiver provides analysis and exploration of data on a fat client with a point-and-click user interface, displaying data in several tabular formats or in one of more than two dozen graphical formats.

NetDiver is a web-based, zero-footprint client that provides ad hoc analytics and diving functionality. NetDiver is designed for self-service users not needing full ProDiver functionality.

CellDiver is a zero-footprint client, Microsoft Excel Add-in that allows a user to dive from an Excel-based console and pull data directly from Data Models into an Excel spreadsheet. Users can open Data Models, dive further into the data, or apply Excel-based functions.

Enterprise Reporting

Diver offers a broad selection of customizable report templates for all user capability levels. Over a dozen chart and plot styles can be incorporated into reports to deliver maximum visual impact. Filtering, sorting, grouping and forecasting functionality are all supported directly from the reporting interface. Reporting options such as Multitab and Crosstab are also available for business analysts enabling analysis and display of data across multiple dimensions. Users can create a collection of reports arranged into categories and have the ability to create downlinks to custom reports.

Diver is tightly integrated with Microsoft Office applications and can export data in several different formats, including HTML, XML and Adobe© PDF files. Based on security settings, Diver reports can also be made available to external users. For more information on security, see the section "Safe & Secure Data Access."

Alerts

Diver's **Broadcast** component allows your organization to send alerts, emails, and reports to designated recipients. Broadcast automatically sends emails based on defined business rules. As data is updated, emails are sent alerting recipients to take action or make decisions based on the data ranging from the audited results of production builds to the latest financial reports. Broadcast runs in an automated and scheduled environment, freeing users from having to manually search for information. Scheduling is extremely flexible, and can be set based on trigger events or time intervals.

DI Access Language (DIAL) is a high-level programming language designed to process, analyze, and distribute information contained in Models. When executed, DIAL programs can access and evaluate summary information in Models, find and flag exceptional data values, and send the results out as email or saved files. In this way, Diver offers administrators and advanced users the ultimate flexibility for custom tailoring of email messages.

Data Access & Control

The **DiveLine** server software provides a suite of powerful administration, data security, and performance components to maintain full control of your data. Through one interface, DiveLine manages all types of users and their corresponding levels of access to specific Data Models, dimensions, summaries, and info fields.

About Dimensional Insight

Dimensional Insight, Inc. is a leading provider of BI solutions with our BI platform and family of purpose-built applications. Our data integration, modeling, reporting capabilities, analytics, portals, dashboards, and applications empower users throughout the enterprise to make timely, data-driven decisions. Thousands of worldwide customers choose Dimensional Insight solutions for flexibility, ease of integration, and rapid time-to-value. Dimensional Insight consistently ranks as a top performing BI vendor in customer satisfaction.

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