Diver Platform™ Technical Overview

A Dimensional Insight White Paper

Contents

Introduction

This white paper provides an overview of Dimensional Insight's flagship product, Diver Platform™ (Diver), an all-inclusive, end-to-end business intelligence (BI) and information delivery platform. This paper describes 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 and custom BI solutions.

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 aggregation and transformation — 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:
Diver Platform supports the entire process of extracting, consolidating, and converting data into a streamlined format suitable for delivery to users. Diver's robust Extract, Transform, and Load (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, Customer Relationship Management (CRM), Enterprise Resource Planning (ERP), Electronic Health Record (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 Spectre technology and the cBases, the performance-optimized columnar data structures. Diver technology transforms large and diverse source data into highly optimized cBase data structures, which are ideal for reporting, analytics, and data visualization. All Diver components interact with cBases. With Diver's in-memory, binary-format columnar data structure, Spectre and cBases provide rapid, consistent response to analytic queries, reports, dashboards, and visualizations regardless of the number of dimensions or the complexity of calculations. Through the power and flexibility of Diver cBases, 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 cBase data structure eliminates data hierarchies and other navigational constraints present within alternative and traditional BI solutions. The cBase data 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 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 cBase data structure and strategic use of in-memory technology ensure 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 allows 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 and developers 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, and more returns on investment. 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 optimizing the in-memory cBase data structure, 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.
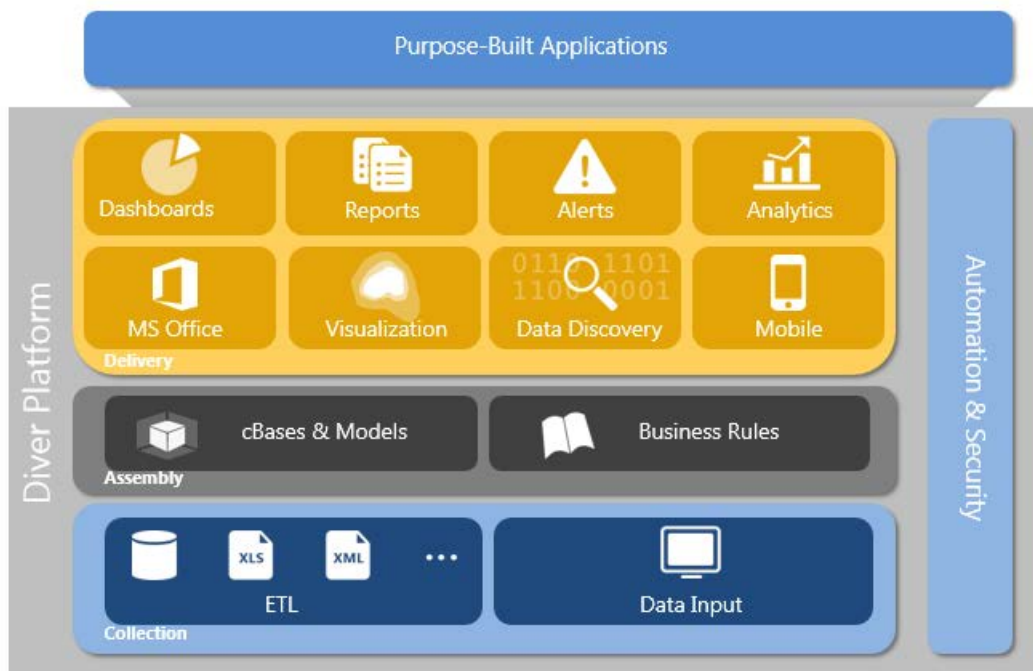
Diver successfully provides time-critical data integration by:

- 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 an in-memory, binary format cBase data structure.
- Providing broader access to transactional data with ad hoc queries by eliminating pre-set drill paths or hierarchical constraints.
- Leveraging existing systems and minimizing total cost of ownership.
- Delivering rapid implementations enabling customers to gain value faster.

Diver Platform — Platform Architecture

Diver Platform is an integrated set of business intelligence components that serve as the basis for Dimensional Insight's business intelligence platform. Diver includes a powerful server engine, DiveLine, that runs on multiple hardware platforms and operating systems. DiveLine's flexible components are designed to streamline processes, and DiveLine supports a selection 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.
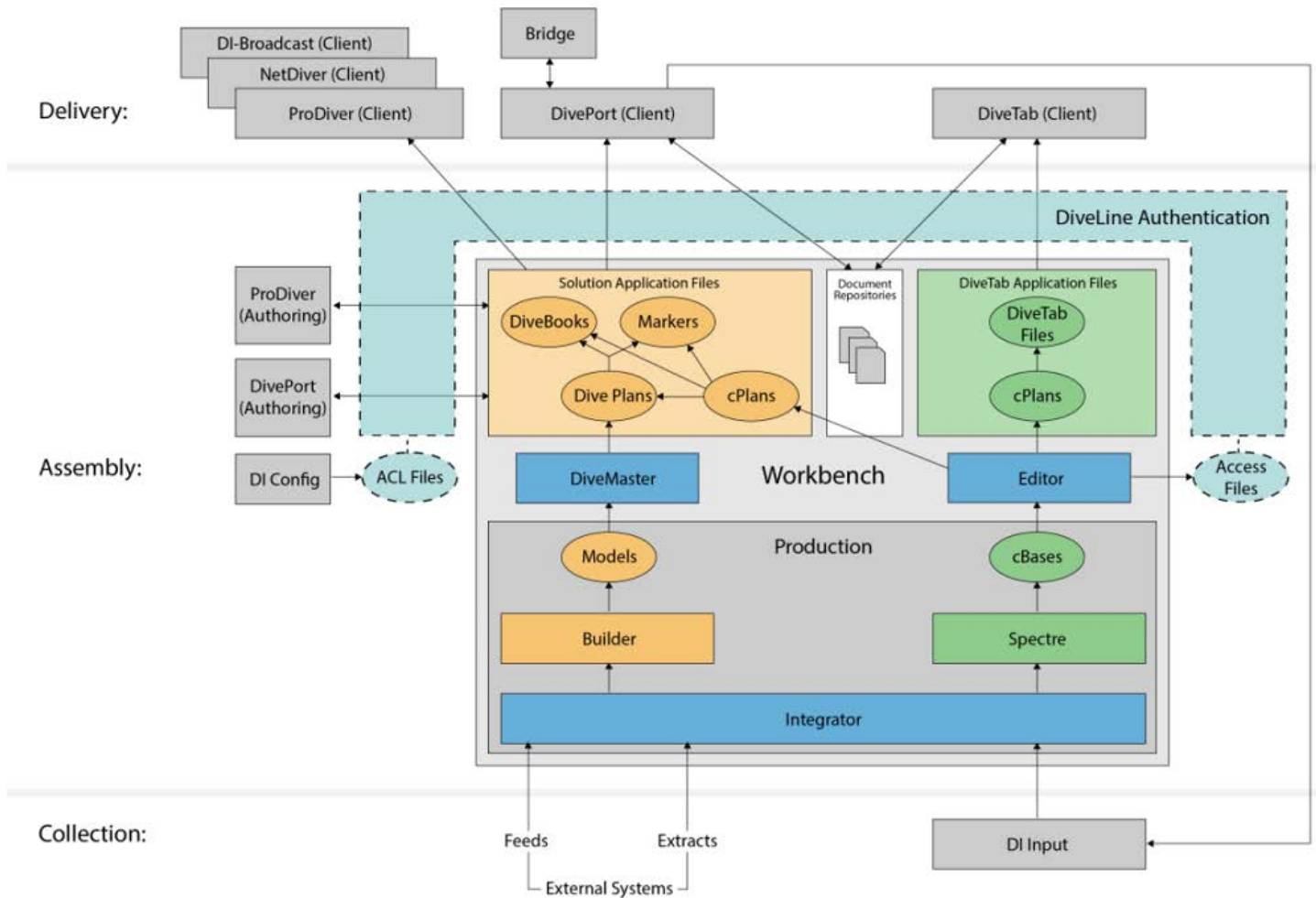
Figure 1: Diver Platform Architecture Overview

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 Diver technology becomes clear (Figure 2). This section provides an introduction to some of Diver Platform 7.0 components. Additional Diver components are defined in the Appendix.

Figure 2: Diver Platform components

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 the location of 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 external system feeds and extracts and combines them to form de-normalized files that are used in the Spectre build. Spectre is the Diver component that preprocesses and parses data to create Diver cBase data structures.

With **Visual Integrator**, a graphical version of Integrator, you can create and test your data manipulation scripts. Working with the graphical objects, you supply attribute names and values in the GUI, and Integrator supplies the underlying script syntax.

Assembly:

Spectre accepts the de-normalized files from Integrator or extracts data directly from a relational database and builds the **cBase** data structure based on user specifications. Diver's technology transforms large and diverse source data into highly optimized data structures that are ideal for reporting, analytics, and data visualization. Spectre designs and builds cBase data structures in "test" mode or in an overnight production environment.

The cBase data structures are the physical, binary files containing the data that are accessed by Diver clients, but the view into the data must be defined. **DiveMaster** is a Workbench component used to create custom views of Models, called **DivePlans**. A DivePlan file describes how a Model is presented to and viewed by clients. DivePlans can also describe how clients view cBases when a special Spectre script, called a cPlan, is used as an input file to a DivePlan. cPlans specify which columns and calculations are available for a dive into a cBase in the same way DivePlans do for Models.

Diver clients **ProDiver** and **DivePort** can be used for back-end development to customize presentation of data.

- ProDiver is an ad hoc data analysis and reporting tool.

- DivePort is a web portlet development tool to construct data portals on a web application server.

See the Appendix — Diver Components for more information about these clients.

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

Delivery:

The **DiveLine** server component handles communication and all security. DiveLine manages all types of users and their corresponding levels of access to specific data cBases and 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.

In addition to back-end clients, Diver Platform front-end clients enable users to access their Diver BI solution based upon their unique responsibilities and requirements:

- **DivePort** is an ad hoc data analysis and reporting tool.

- **DiveTab** is an optional mobile client that delivers self-service reporting and analysis to facilitate data-driven decision making.

- **ProDiver** is an ad hoc data analysis and reporting tool.

- **NetDiver** is a zero-footprint client that displays in a browser and replicates ProDiver functionality.

See the Appendix — Diver Components for more information about these components.

Safe & Secure Data Access

All Diver components meet the most stringent security requirements to ensure that data remains safe and private. 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:
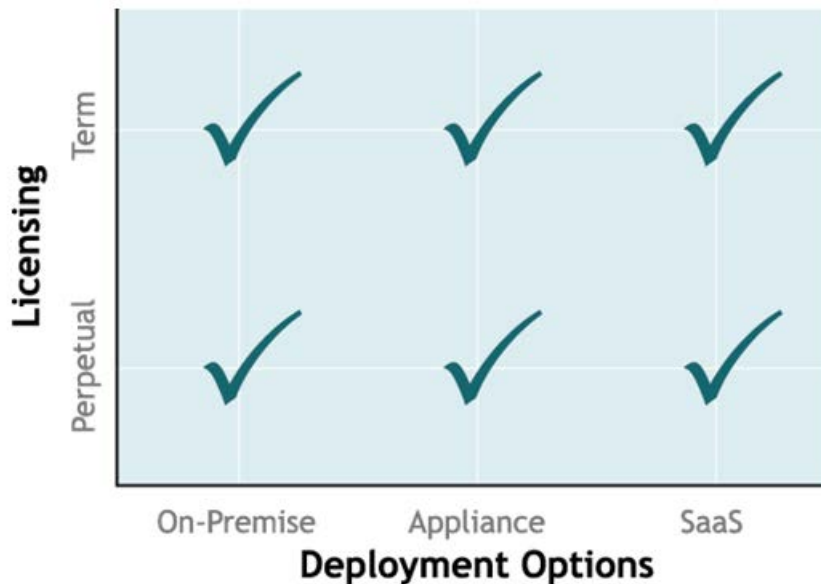
- **User Authentication:** Authenticate users with one of four methods: Dimensional Insight's proprietary configuration protocol, web server authentication on supported web servers, LDAP authentication on supported platforms, and System authentication on supported UNIX platforms. The **Bridge** web application based on DivePort technology supports Single Sign On (SSO) integration and can manage access to your portals and web applications through a single URL. Users authenticate to the Bridge and are presented with all the applications to which they have access. Bridge allows users to access Diver versions 6.4 and 7.0 and other specific Diver applications, as well as other web sources.

- **Access Control:** Only users who have been authenticated can view data within Diver cBases. Customized, role-based data access control can be defined by cBase, Dimension, Summary, Access Control List, properties, and user groups. Properties are collections of values that are assigned to groups and users. Each user's access is then the union of all values from assigned groups plus individually assigned values. 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.

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.

Figure 3: Diver Platform 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 data structures 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 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 use 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 technical 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 columnar data structure 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 develops all of its technology internally, without outside licensing or acquisition. Therefore, research and development focuses 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.
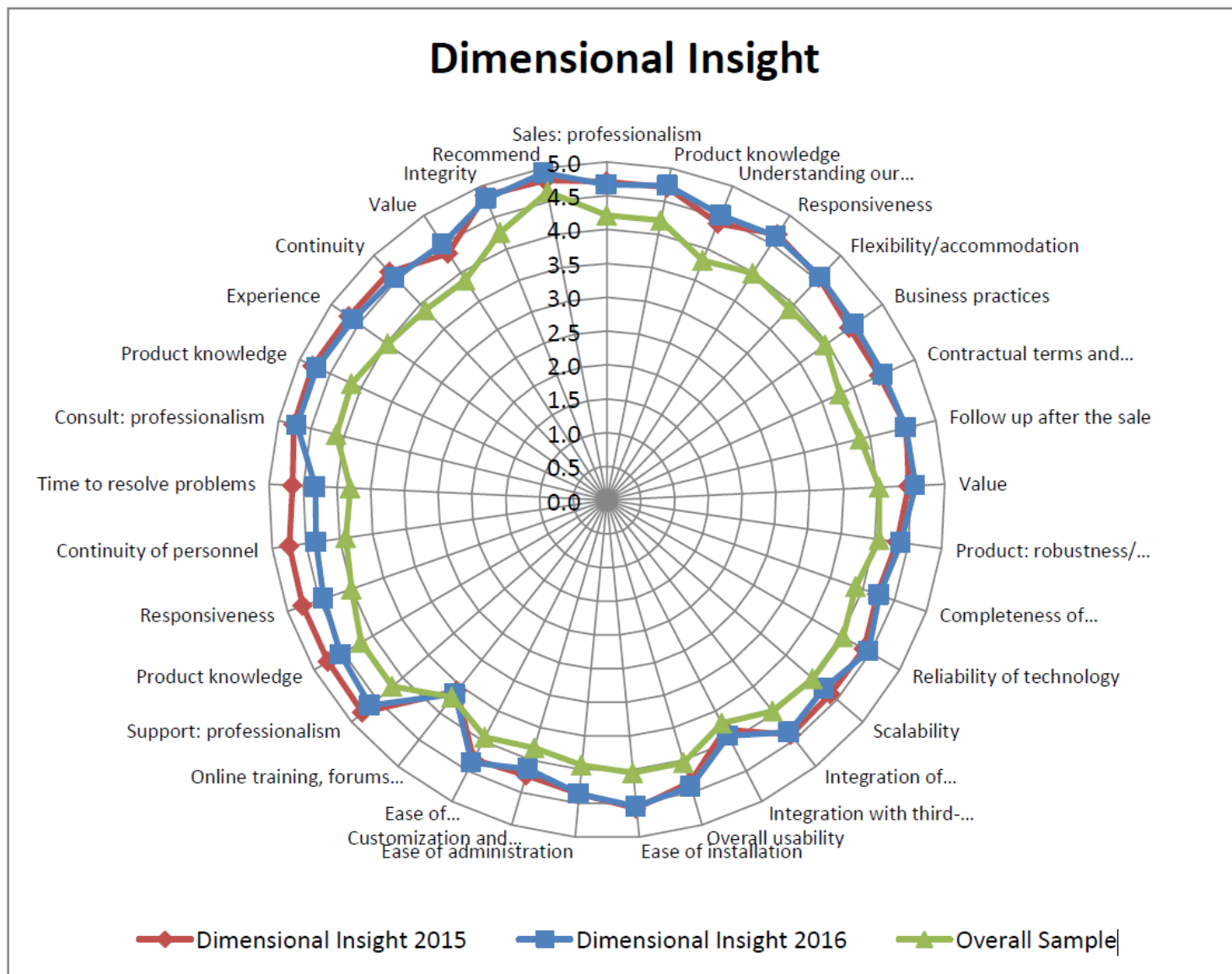
Industry Recognition

Over the years, Dimensional Insight and Diver Platform have received high rankings from independent analysts and research firms.

2016 Wisdom of Crowds® BI Market Study

In its "2016 Wisdom of Crowds® BI Market Study," **Dresner Advisory Services, LLC** recognized Dimensional Insight as a top BI vendor for the seventh consecutive year. The study reports "With scores well above the entire sample, Dimensional Insight is a consistent overall leader in both the Customer Experience and Vendor Credibility

models."[1] Dimensional Insight received "best in class for sales product knowledge, understanding customer business/needs, flexibility/accommodation, business practices, contractual terms and conditions, follow-up after the sale, consulting product knowledge, and experience."[2] Figure 5 shows the detailed information about Dimensional Insight's performance relative to the previous year's performance and to the average for all other vendors.

Figure 4: 2016 Wisdom of Crowds® BI Market Study Results[3]

THE BI Survey 16

In 2016, Dimensional Insight ranked #1 in 14 categories and a leader in numerous additional categories of "The BI Survey 16," 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 sixteenth year and features submissions from over 3,000 business intelligence end users, analyzing 37 different BI

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[1] "2016 Wisdom of Crowds® BI Market Study," May 31, 2016, available from Dresner Advisory Services, LLC
[2] "2016 Edition Wisdom of Crowds®", Dresner

products. Below is a synopsis of the category evaluations in which Diver received the top ranks.[3]

- **Big Data Analytics** and **Data Volume** — Diver's high performance columnar database scales to address the needs of big data use cases. Diver provides users with a unique, interactive environment in which to efficiently and effectively understand their data regardless of volume or complexity.

- **Business Benefits** and **Business Value** — Diver ranks first amongst self-service reporting, dashboarding, and Americas-focused peer groups in Business Benefits. Diver delivers significant, quantifiable business benefits proving its value by providing actionable information from data.

- **Competitiveness** and **Recommendation** — Diver's strong offerings and value proposition along with consistently top-ranked customer and product satisfaction stack up to competitive pre-sales position. Existing customers vouch for Diver and are highly likely to recommend Dimensional Insight to industry peers.

- **Implementer Support** and **Customer Satisfaction** —Dimensional Insight's customer centric approach to business intelligence is backed with strong industry experience to support customers through all phases of implementation and deployment to ensure success.

- **Product Satisfaction** and **Project Length** — Dimensional Insight takes top-ranked and leadership positions when it comes to quickly implementing Diver solutions.

- **Query Performance** and **Performance** — With Diver's top-ranked query performance, customers gain immediate insight into complex data relationships and find answers to business questions within seconds directly from interactive dashboards.

2015/2016 Best in KLAS winner in Business Intelligence / Analytics

Diver was named "Best in KLAS for Business Intelligence/Reporting" in 2016, for the fifth year 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 of 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.

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[3] "THE BI Survey 16," May 2016, available from BARC — Business Application Research Center, a CXP Group Company

Summary

Diver Platform 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 and custom BI solutions. 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. **Workbench**, the Dimensional Insight integrated development environment (IDE), centralizes access to the components. The following sections organize the description of the components functionally 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.

Collection:

During the Collection process, the incoming data is reviewed in order to assess the data contents, its quality and cleanliness, and its integrity, which are all vital elements of the ultimate data structure.
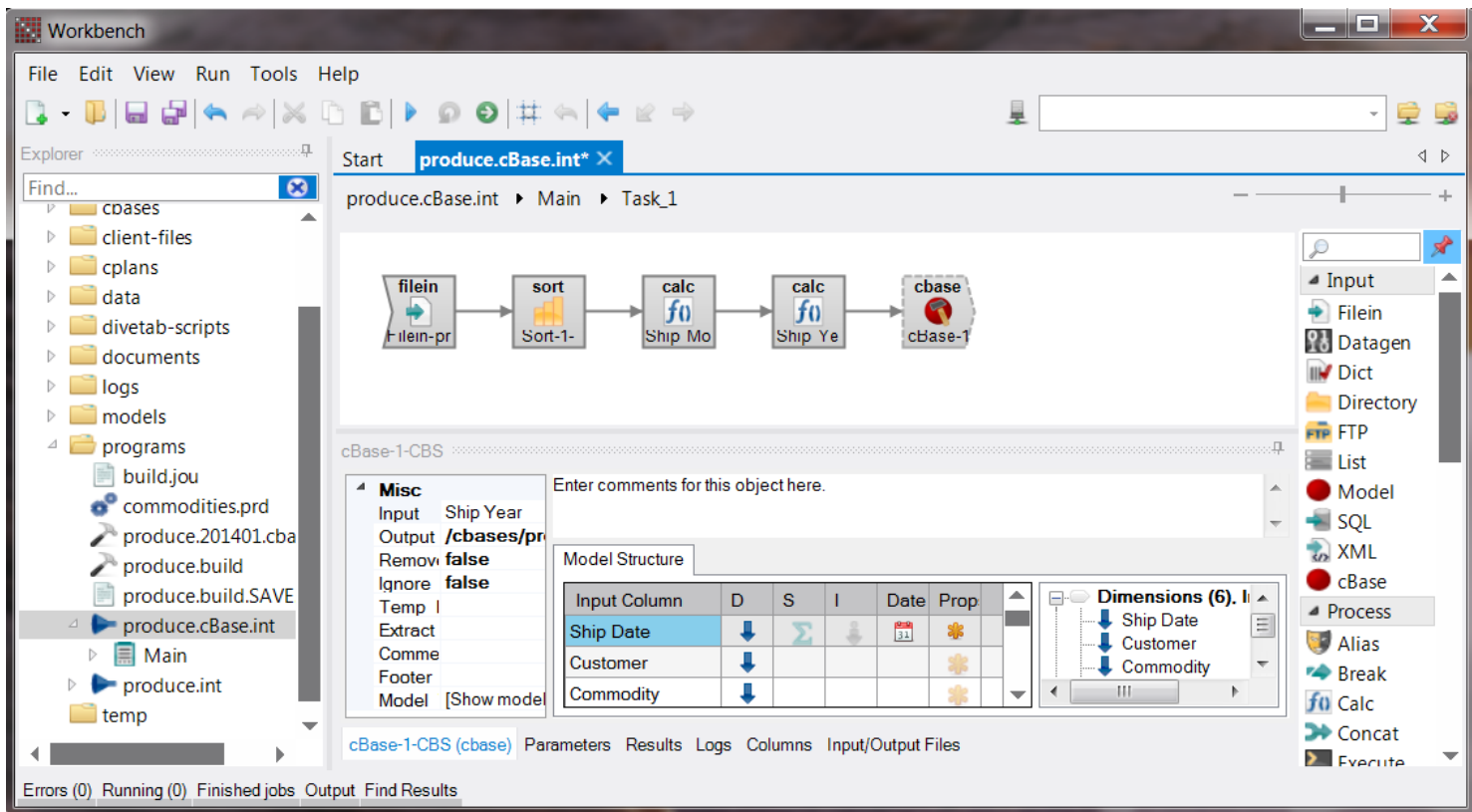
Integrator (Figure 6) is a robust, object-oriented Extract, Transform, and Load (ETL) tool that contains a large suite of powerful data manipulation functions including joins, lookup tables, and filters. Integrator accepts inputs from various sources. Data input can be designed to use either a push or 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.

Integrator manipulates and integrates flat files and 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 assembly.

Integrator can also be used as a standalone ETL tool; performing the functionality described above and writing to databases not associated with the Diver implementation.

Visual Integrator (Figure 6) is part of Workbench, the Graphical User Interface (GUI) development environment. Visual Integrator manages the preparation and organization of scripts and macros. With Visual Integrator, users define data integration work flows using graphical objects, letting the command line Integrator generate the underlying script syntax. Visual Integrator provides the same functionality as the command line Integrator.

Figure 5: Visual Integrator in the Workbench IDE

Assembly:

During Assembly, the final data structure design is reviewed, the data relationships established in Integrator are verified, and the build process proceeds. At implementation and over time, as new data requirements emerge, the build process is iterative. If new requirements are defined, the developer can loop back to Integrator, Spectre build scripts, or Builder to make the appropriate changes. This feature enhances the build process and results in better data structure designs that are derived faster.

Spectre data analysis software builds and queries the cBase data structures and powers the DiveLine server software. The Spectre build scripts accept various data sources as input to the build, including the following types:

- Integrator output files
- Flat files
- ODBC compliant data feeds
- Dive files, which are files that describe Spectre queries
- Extracts from a data warehouse, relational database, or legacy system

The cBase data structure uses columnar technology to optimize complex queries from Dimensional Insight clients. For example, Dimension Counts (DimCounts), which are calculations of the number of unique values for a selected dimension, and Time Series, which is functionality to present columns that are limited by time-based periods are optimized.

The Spectre **cPlan** (file extension .cplan) defines input sources and data calculations for cBases. cPlans specify which columns and calculations are available for a dive into a cBase the same way DivePlans do for models.

Builder summarizes, indexes, and preprocesses data 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. Like Spectre, Builder accepts input from a variety of heterogeneous data sources, file systems, and repositories. 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.

DiveMaster is a component of Workbench used to create custom files, called DivePlans, that describe how a Model, or multiple Models, can be viewed. DiveMaster joins multiple Models and Lookup tables together into a single virtual Model. 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, such as combining a sales invoice Model with an inventory Model over a 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.

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.

Production helps back-end developers frame their development efforts. As an integral part of Workbench, Production is a visual tool that allows for an overview of a process, while facilitating construction, testing, and real-time monitoring of the scripts. One or more Production scripts can be used depending on the complexity of the data and desired outcome.

Scheduler allows an administrator to automate events, such as running Production scripts and Integrator programs, launching Spectre to create and update cBases or Builder to do the same for Models, and generating and sending reports. Scheduler assists in optimizing system resources and server performance, ensuring the cBase and data Models are 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, and 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 almost four dozen graphical formats. For example, with ProDiver you can perform ad-hoc dives, reformat presentations as reports or graphs, and save and reopen presentations after data is refreshed.

Mobile

DiveTab is an information delivery platform designed to provide mobile users access to structured data, such as reports and dashboards, and unstructured data, such as presentations and documents. DiveTab delivers self-service reporting and analysis to facilitate data-driven decision making. DiveTab is available for Apple© iPad® and Microsoft® Windows® platform.

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.

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 cBases and Models. When executed, DIAL programs can access and evaluate summary information, 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 cBases and Data Models, dimensions, summaries, and info fields.

About Dimensional Insight

Dimensional Insight, Inc. is a leading provider of BI solutions with the Diver Platform and custom BI solutions. 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.