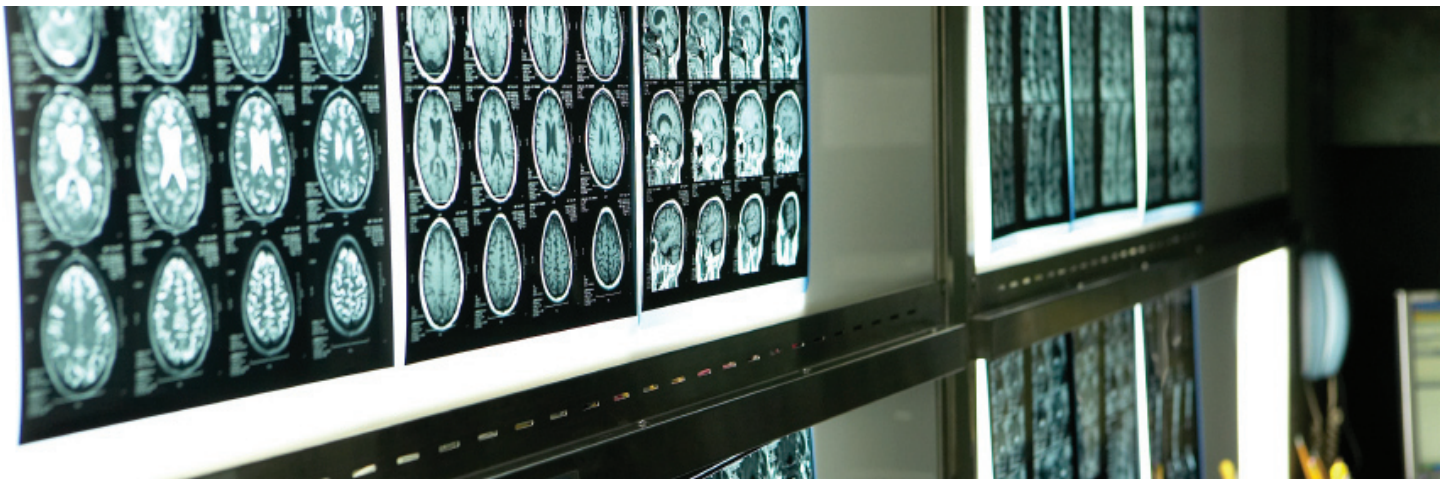

Unlocking your MEDITECH™ Data: Deploying Business Intelligence for Transparent MEDITECH™ Data Access

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Dimensional INSIGHT
DATA→INFORMATION→ACTION

EXECUTIVE SUMMARY

The Diver Solution for Healthcare™, a best-of-breed business intelligence tool marketed by Dimensional Insight (DI), streamlines the generation and dissemination of reports and dashboards to healthcare professionals with DI-Connect for MEDITECH. The Diver Solution also supports active ad-hoc analysis at all data levels. Available for the MEDITECH MAGIC™ environment, DI-Connect offers an alternative data extraction methodology to the MEDITECH NPR engine.

The Diver Solution leverages the information content of the MEDITECH environment by providing seamless access, integration, and transformation of the chronological data stored in MEDITECH. The Diver Solution dashboards and customizable reports deliver intuitive displays of Key Performance Indicators (KPI's) and a host of user selected metrics, freeing hospital staff and administrators to focus on their core responsibilities and react quickly to critical priorities. The Diver Solution supports three flexible deployment options. Traditional onsite, on-demand business intelligence, or hybrid implementations can be adapted to the size, budget and needs of each healthcare organization.

This paper discusses DI-Connect for MEDITECH functionality and illustrates why The Diver Solution is an efficient, flexible, and cost effective way to unlock valuable information from the MEDITECH Healthcare Information System (HCIS).

Examples of the applications Dimensional Insight customers have built using The Diver Solution:

- Clinical outcomes analysis
- Financial analysis
- Physician scorecarding and pay-for-performance reporting
- Patient satisfaction analysis
- Hospital bed census
- Nurse staff scheduling analysis
- Productivity reporting
- Adverse drug interaction alerts
- Physician and executive dashboards and portals

DATA-DRIVEN HEALTHCARE WITH THE DIVER SOLUTION FOR MEDITECH

Today's leading healthcare providers rely on data-driven analytics and evidence-based decision support to satisfy the dual mandates of cost containment and optimal

patient care. The MEDITECH HCIS is a flexible and reliable system for gathering and manipulating healthcare data in an operational setting. However, to maximize the investment in a MEDITECH installation requires the deployment of a business intelligence suite such as The Diver Solution. With a wealth of experience in the healthcare industry and the MEDITECH environment, Dimensional Insight is uniquely positioned to provide healthcare providers with a robust and flexible suite of business intelligence tools.

THE DIVER SOLUTION - MEDITECH INTERFACE The Diver Solution accesses MEDITECH data, transforms it into useful information and presents that information to healthcare professionals in a manner that facilitates quick action. This section explains how this process unfolds.

Each DI-Connect module collects data from one MEDITECH application (BAR, PP, ADM, etc). By using multiple DI-Connect modules, data from numerous MEDITECH applications can be combined, even if the databases are stored on different MEDITECH servers. The DI-Connect technology allows scheduling, connection, and extraction of data from MEDITECH systems to be handled by The Diver Solution server. Once DI-Connect is installed, it is no longer necessary to use the NPR engine or interact with MEDITECH scheduled jobs to collect data for The Diver Solution applications.

ACCESSING MEDITECH AND EXTERNAL DATA

In the MAGIC environment, DI-connect consists of three elements — a server component (DI-Connect Daemon), a client (DI-Data Integrator), and one or more plug-ins to the Data Integrator.

DI-CONNECT DAEMON The server component (DI-Connect Daemon) is installed on one or more MEDITECH servers and is included in all DI-Connect installations. The Daemon module listens for TCP requests on a specified port and handles those requests as they arrive from the client component (DI-Data Integrator).

Installation of the Daemon involves creating a directory on the MEDITECH server, placing a file in that directory, and setting a TCP port to listen. Once operational, TCP connections to the new port will be connected to a process running the program placed in the directory. OPS access to the server is required, and time to complete the operation is minimal. Resources required are negligible when no extract is running. When an extract is running, the server load is no greater than for a comparable data extract using NPR.

DI-CONNECT PLUG-INS Each DI-Connect module is delivered as a plug-in to the DI Data Integrator. The plug-in contains the necessary scripts and logic required to extract the data for a particular data set from MEDITECH. The plug-ins are packaged by functional area, rather than by MEDITECH module. Each plug-in may extract data from multiple modules, and different plug-ins may extract different data from some of the same modules. A configuration file for each plug-in allows the administrator to set certain parameters. This is most commonly used to define the time period for each type of extract.

DI-DATA INTEGRATOR The DI Data Integrator acts as the conduit for DI-Connect extracts. The plug-ins are called and executed by the Integrator, which in turn initiates the connection to the MEDITECH server. For customers using the MEDITECH Data Repository, DI-Connect uses a standard ODBC connection to extract data. Because the structures in the Data Repository differ from those in the native MEDITECH database, DI-Connect maps fields identically to the MAGIC environment to maintain compatibility. Once extracted, data from the Data Repository is handled as in the MAGIC environment.

DI-Connect is a small-footprint application and requires minimal MEDITECH server resources. Due to its efficient data extraction methodology, DI-Connect supports real time extracts for applications such as available-bed census. For applications that require less frequent updates, DI-Connect can be scheduled to perform data acquisition tasks from the MEDITECH server at off-peak hours.

DATA AGGREGATION AND TRANSFORMATION In addition to the chronological data housed in their MEDITECH HIS, a modern healthcare organization increasingly relies on a wide array of internal and external data sources to ensure regulatory compliance, support accreditation initiatives, increase operational efficiency and perform benchmarking of the services they provide. Evidence-based content providers, clinical decision support systems and industry benchmarking data vendors all supply crucial, yet structurally diverse data that must be extracted, integrated and displayed in a timely and easily understood manner.

Once relevant data has been extracted from selected MEDITECH modules and external sources, business rules and data relationships are established and applied to create analysis and reporting applications based on individual customer requirements. The Diver Solution's Data Integrator, a powerful Extraction, Transformation, and Loading (ETL) tool, automates the process of data aggregation, merging, and transformation. Supported available inputs include text files, ODBC-compliant databases such as the MEDITECH Data Repository, Microsoft Excel spreadsheets, and MEDITECH data accessed via the DI-Connect Gateway.

The modular nature of the Data Integrator allows MEDITECH data to serve as one of a number of inputs to a data collection and assembly process. Appendix B lists some of the many supported applications and file formats that can be accessed via the Data Integrator.

The Diver Solution transforms the data collected from disparate sources into a cohesive Data Model — a patented, highly indexed data structure that expedites analysis and report generation. Data Models are multi-dimensional, rather than relational, facilitating rapid adhoc analysis without requiring predefined queries. Huge volumes of transactional data, of marginal value pre-transformation, are converted into high value, actionable information.

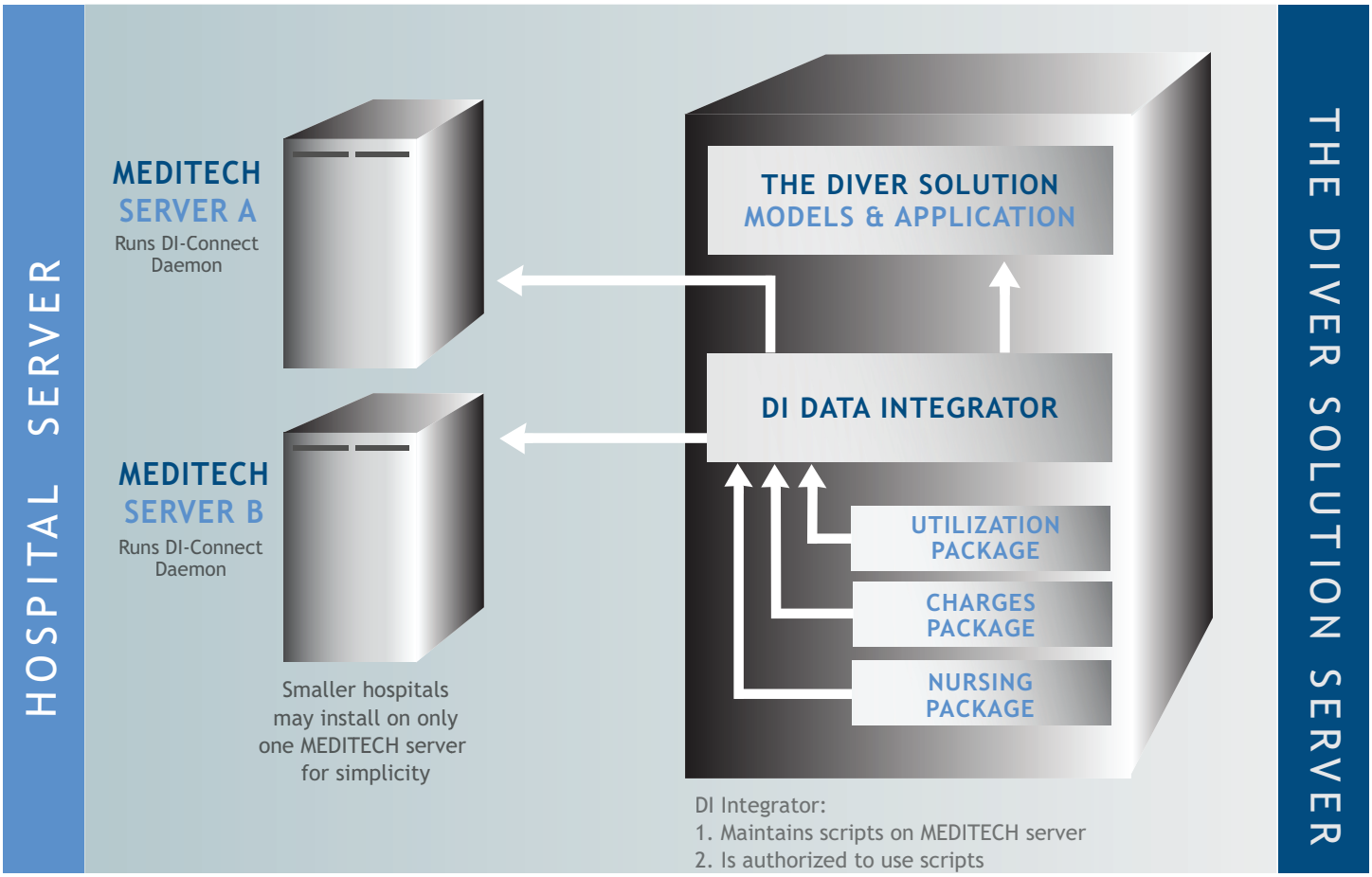

Figure 1 - The Diver Solution's DI-Connect TO MEDITECH Interface

INFORMATION DELIVERY AND PRESENTATION The Diver Solution takes full advantage of Internet, web browser, and zero-footprint client technology to provide a simple, low overhead approach to information delivery and administration. The spectrum of user needs is met through the delivery of information across three functionality levels:

- Advanced users access powerful client interfaces for creating and delivering reporting and data analysis applications to the organization.
- General users start from reports and graphs within a portal view, and can perform role specific analysis with a zero-footprint client interface.
- Casual users can view and print reports within the portal, and download the data they see into spreadsheet or Adobe Acrobat file formats.

The Diver Solution dashboards deliver information in a clear and straightforward manner, allowing busy hospital administrators and medical professionals to focus on the most critical KPI's through intuitive graphics and color coded indicators. The dashboard below displays a concise encapsulation of a hospital's financial and operational performance.

The Diver Solution's portal interface, DivePort, serves data to all three user levels. Security and data administration are provided by DiveLine, DI's server component, ensuring that users access only data for which they are authorized. These sophisticated security measures provide a platform that assists hospitals in meeting stringent HIPAA requirements.

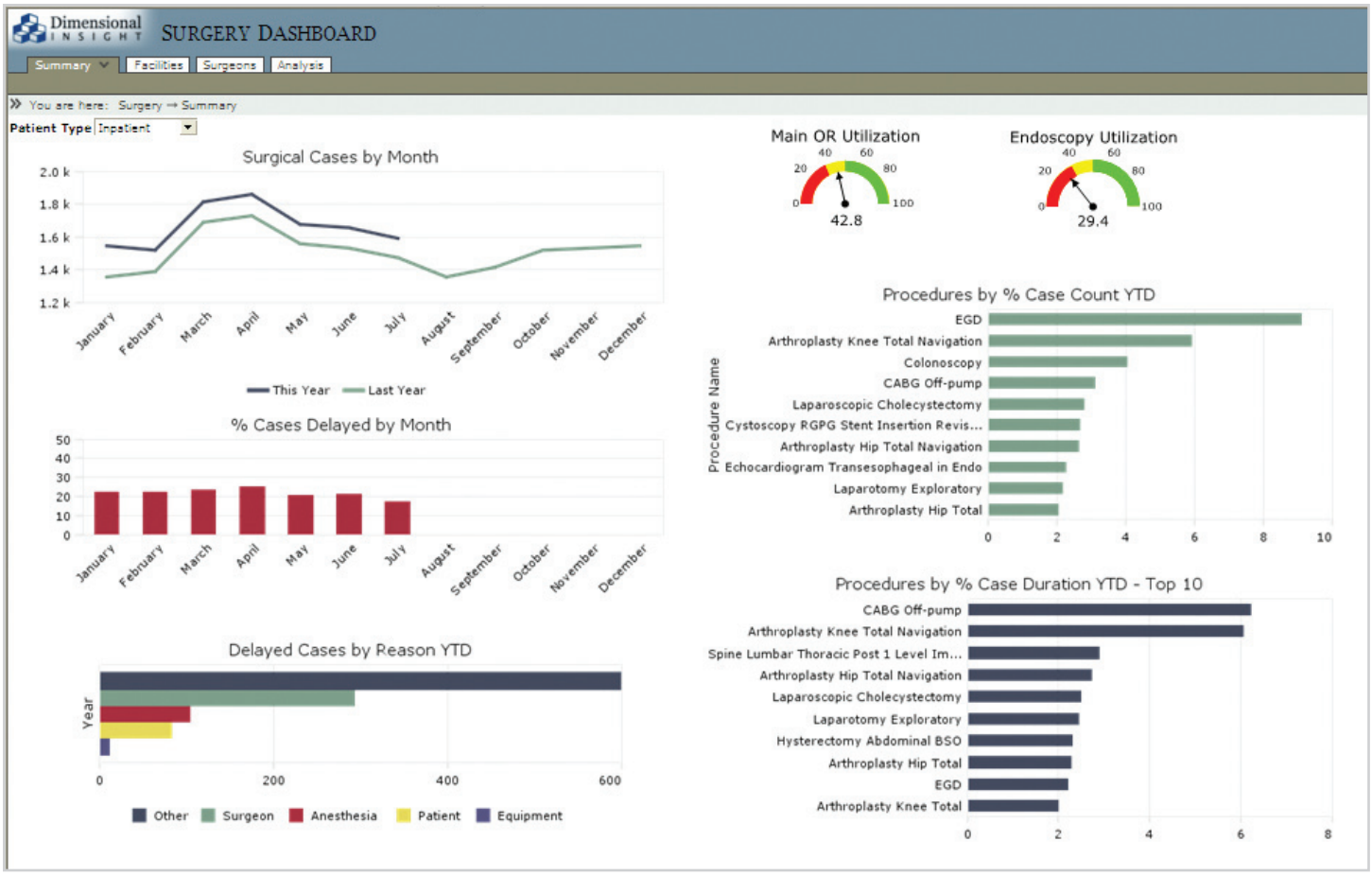

Figure 2 - The Diver Solution's dashboards facilitate "at a glance" information delivery.

Automated report generation is an important feature of The Diver Solution. This frees IT staff from support duties usually associated with business intelligence reporting tools. Reports can easily be customized in a number of ways to help convey information in the most comprehendible manner.

Tables, text, and charts can be combined in a single view, such as the following patient traffic report:

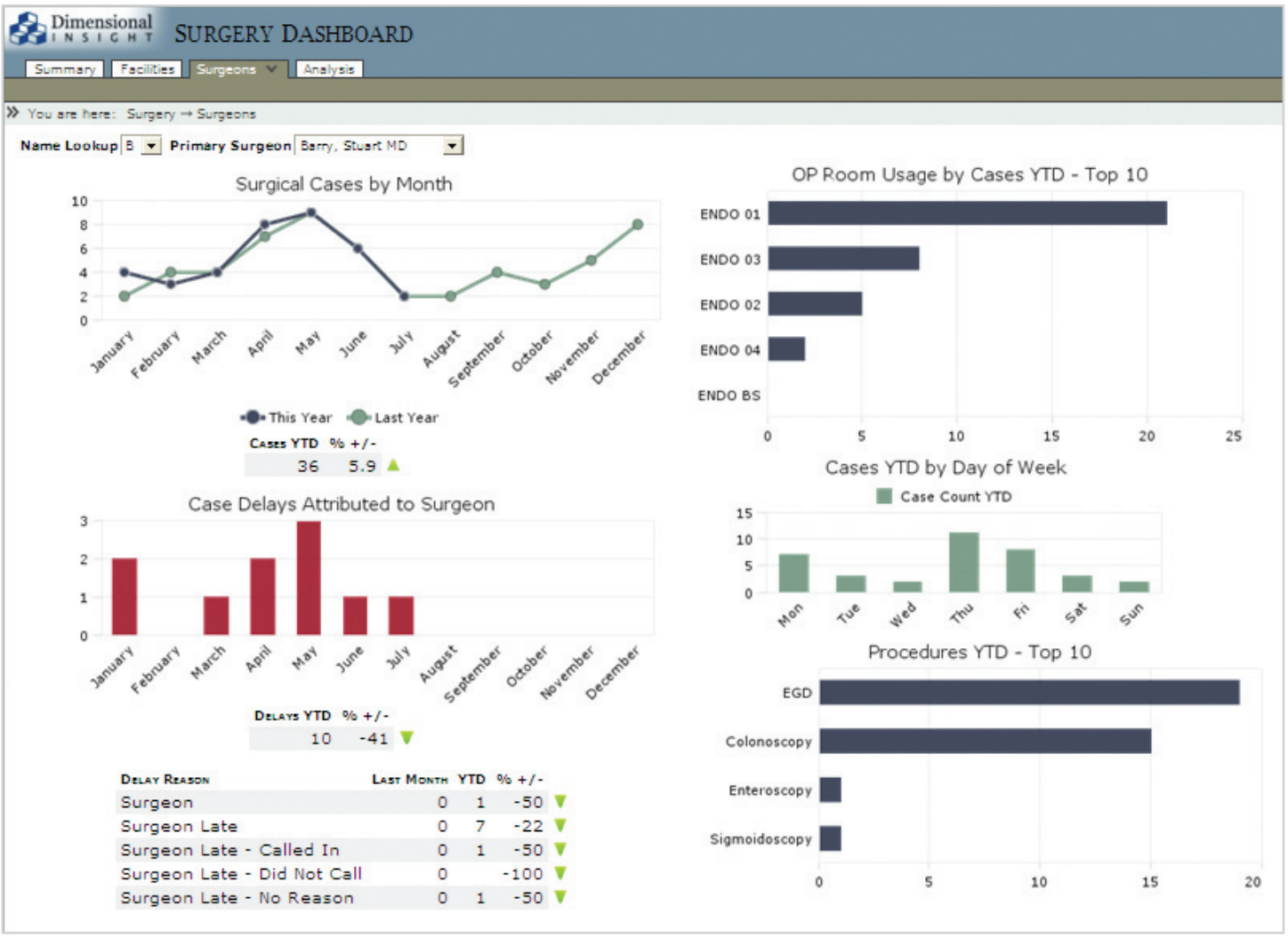

Figure 3 - Fully customizable reports can combine tabular, chart, and text-based information for maximal impact.

"MEDITECH is a great data repository, but it is difficult to get data out of it, especially patient-level detail data. We wanted a solution that would allow us to access this information so we could easily analyze factors such as readmissions, turnover time, admission time of day, and staffing"
Michelle Heezen
Central Vermont Medical Center's (CVMC) Budget & Reporting Manager

DIVER SOLUTION DEPLOYMENT OPTIONS

This section discusses the flexible deployment options available for The Diver Solution. Customers can choose hosting and configuration options appropriate to their user population and budgets.

ON-DEMAND BUSINESS INTELLIGENCE According to Microsoft2, "changes in software delivery to businesses are driving strong demand for hosting solutions. On-demand business intelligence, also known as Software as a Service (SaaS), has now become a reality thanks to elements such as ever-present broadband penetration rates, lower hardware costs and high availability of service."

Consulting group THINKStrategies points out numerous benefits3, providing organizations with 'turn-key' software solutions that can be implemented quickly, while avoiding incremental infrastructure costs such as costly virtual private networks (VPN's) and eliminating the ongoing administrative resources of traditional on-site applications. Ondemand business intelligence is a growing approach to delivering business applications. For companies that have implemented some form of on-demand business intelligence, the economic results are positive.

According to a 2006/2007 survey by Computer Economics, there is no doubt that consumer adoption rates are greatly increasing. As this survey shows, 57% of vendors indicate that economic benefits exceeded the cost of the investment, while34% report a break even ROI. Only 9% of respondents indicated a negative ROI.

Additional empirical data collected by AMR Research4 further underscores the customer benefits delivered by on-demand solutions compared to traditional, internally hosted solutions:

- 35% increase in users
- 27% increase in employee productivity
- 26% decrease in initial/start-up costs
- 24% decrease in TCO over 3 years
- 23% increase in ROI
- 15 month decline in implementation

The on-demand deployment model is particularly well suited for small, regional healthcare providers that typically suffer from lack of IT resources. On-demand solutions allow these providers to experience the same business intelligence benefits of a larger healthcare organization without having to hire IT support staff or make significant hardware investments.

THE DIVER SOLUTION AS A HOSTED IMPLEMENTATION Deploying The Diver Solution as an on-demand solution ensures far quicker deployment times than traditional installations, allowing healthcare providers to rapidly acquire best-in-class business intelligence capabilities. The Diver Solution customers benefit from zero-footprint, web-based access with increased reliability since DI staff handles system backups and network monitoring and troubleshooting.

Communication between the The Diver Solution InterReport server farm and the customer's MEDITECH server can be facilitated in one of two ways:

1. A server configured with the DI Data Integrator is installed at the customer site. Since computational requirements are minimal, DI Data Integrator could also be installed on an existing, shared server. This server uses DI-Connect to perform data extraction from the MEDITECH server. The DI-Integrator server then uploads the data extracts to The Diver Solution InterReport server farm on a scheduled basis.
2. A Virtual Private Network (VPN) is configured between the customer's MEDITECH server and The Diver Solution InterReport server farm. The DI Data Integrator resident on the InterReport server initiates and manages data requests directly with the customer's MEDITECH server.

"Automation of report generation is a top capability for alleviating strain on IT, and empowering users with information faster. Dimensional Insight customers are outperforming Best-in-Class and all other organizations when it comes to the automation of report generation activities."
Aberdeen Research[1]

SUMMARY

Dimensional Insight's The Diver Solution is a best-in-class business intelligence tool for the MEDITECH environment. Complying with increasingly arduous regulatory requirements, driving efficiency by identifying potential cost savings and staying ahead of the competition by delivering stellar healthcare services all depend on high quality information derived from large volumes of data. Combining transparent data access, seamless integration with external data sources and powerful presentation capabilities, The Diver Solution delivers healthcare providers the information needed to run their organizations efficiently, competitively and in compliance with regulatory requirements.

REFERENCES

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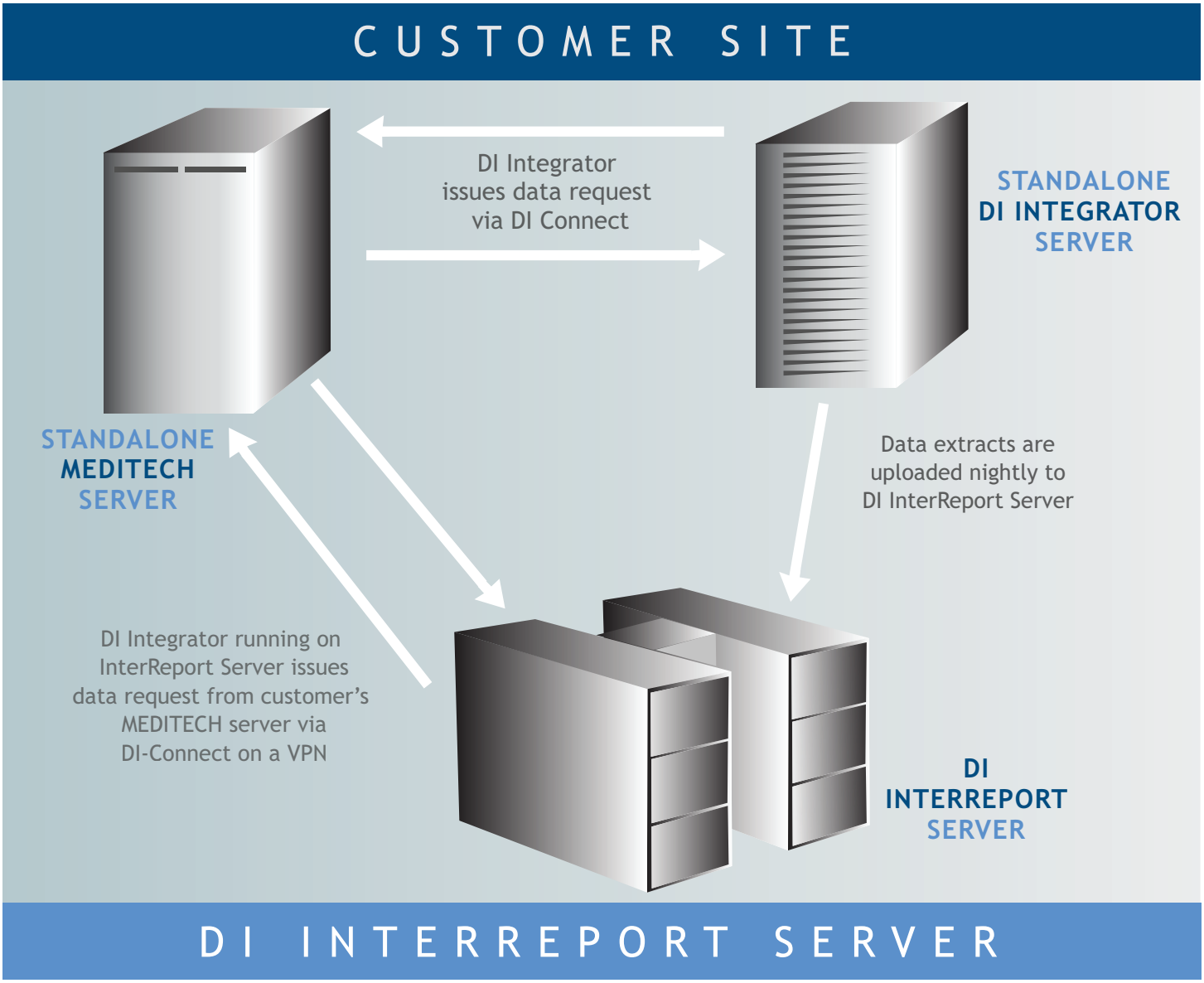

Figure 4 - Two potential Diver Solution on-demand business intelligence configurations.

APPENDIX A - PACKAGED EXTRACT SOLUTIONS

DI-Connect offers packaged extract solutions for MEDITECH MAGIC customers. By including DIConnect in a Diver Solution implementation, DI offers MEDITECH users a seamless, rapid implementation cycle. Extracts are tested for performance and data integrity, and the entire process is controlled by The Diver Solution server, requiring no maintenance for hospital personnel on the MEDITECH system itself after installation.

Extracts are grouped into packages by functional area. The Utilization and Common packages are required for all users. Additional modules may be included based on the needs of the customer. New fields or extracts may be added on a consulting basis. Maintenance on DIConnect includes updates to the packages as new fields are added over time. The following extract packages are available:

UTILIZATION: This package provides encounter-level data for every patient seen, including demographics, locations, procedures, diagnoses, physicians and basic financial information. Information is based on ABS, with information from BAR and ADM as needed.

COMMON: Included with Utilization, this package contains basic code-description lookups, including physicians, nurses, diagnoses, procedures, and patient type descriptions.

CHARGES: Extracted primarily from BAR, this package includes charges, receipts, adjustments, and refunds for all procedures.

NURSING INTERVENTIONS: Based on care plan queries in the NUR and, optionally, EDM modules, this extract provides access to custom queries in nursing intervention screens. Combined with Utilization data, it allows users to identify nursing responses to particular patient types.

LAB: Using data from LAB, this package extracts data on lab tests performed, results, abnormal and panic values, and lab personnel.

MICROBIOLOGY: The Microbiology package includes information on cultures grown, organisms identified, antibiotics tested, and the susceptibility of organisms to those antibiotics.

APPENDIX B - SUPPORTED SYSTEMS AND DATA FORMATS

DI has a strong base of expertise integrating The Diver Solution with a broad spectrum of disparate data sources, a few of which are listed here:

3M Health Information Systems
AS/400-based claim systems
API
CareFacts
CareVision
Cerner
Clinicomp
DB2
Eclipsys
Epic
GEAC
Great Plains
IDX
Informix
InterSystems Cache
Kaufman Hall
Kronos
Luminex
McKesson
MediCare ANSI 835
MedInsight
MEDITECH
MedSeries-4
Microsoft Access
Microsoft Excel
Microsoft SQL Server
OneStaff
Oracle
PeopleSoft
Per-Se Technologies
Picis
Premier
Press-Ganey
QuadraMed
QDM Patient/Physician Satisfaction
Siemens
SoftMed
Solucient
Sybase
TPA Feeds
Visual Prime
Webhire