

Teradata Data Integration Roadmaps and Logical Data Models

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Overview

Today's business users are inundated with data and looking for valuable insights from their information. They're challenged to understand and interpret increasing amounts of data and to turn that data into actionable information and informed decisions. Enterprise users want answers to critical questions such as:

- > What data do I have?
- > What data do I need?
- > Where are the data?
- > Where did they come from?
- > Are they reliable?
- > How fresh are they?
- > What is the level of data quality?

The phrase, time is money has never been truer. Our global, fast-paced economy has driven businesses to gather more data, analyze more information, and make decisions in shorter periods of time than ever before – in some cases time is compressed to near real time.

It follows that time is money means that time savings across an enterprise yield greater economic value.

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Integrated Data Warehouse

It's generally accepted that the data warehouse is the environment that supports analytical capabilities within the organization. By adding the word integrated, that environment is now thought of, or expected to become, reflective of the integrated enterprise. Integrating data in a data warehouse is a major strength of Teradata Corporation, but the capabilities described herein are equally applicable for businesses with data warehouses of all forms.

Before continuing, let's discuss the environment that Teradata refers to when we say integrated data warehouse. We define an integrated data warehouse as an area where the data of the business (the enterprise) are centrally integrated, centrally stored, and accessed through common business defined methods. We believe, and our customers have shown us, that the value of integrating data is the value gained by storing the data once, managing it once, and accessing it for many varied ways, times, methods, and reasons.

Value is increased dramatically when the enterprise is able to ask any question at any time of its data warehouse.

Data Warehouse Benefits and Challenges

Businesses of all sizes and in different industries are discovering significant benefits by implementing a data warehouse. It's generally accepted that data warehouses provide an excellent approach for transforming the vast amounts of data that exist in these enterprises into useful and reliable information for getting

answers to their questions and to support the decision making process. However, mention of an integrated data warehouse often suggests big, complex, lengthy, and expensive implementations. The Teradata® Data Integration Roadmap (DIR) model and a corresponding Teradata Logical Data Model (LDM) ensure your implementations are smoother, faster, and not beset with these challenges. The Teradata DIR model and LDMs assist you in making the best possible decisions.

Unique Teradata Offers

Teradata offers products and services called the Teradata Data Integration Roadmap (DIR) and corresponding integrated Teradata Logical Data Models (LDMs) including the unified modules that can help any organization cope with abundant data, compressed business cycle times, and constant economic pressures. Building an integrated data warehouse can be a daunting task. Conventional wisdom says it's a time-consuming, complex, resource-intensive activity to complete. Why not get a jump start on that process with a boost from the Teradata DIR model and LDM? Formal tools, such as the Teradata DIR model and LDMs can map business opportunities and benefits to the technical work required to help an organization capitalize on a long-term investment by identifying options and making it easier to justify follow-on projects.

When used together, the Teradata DIR and LDM offer provides rapid time-to-value rewards for leading organizations to leverage Teradata's knowledge, best practices from our customers, and industry

expertise by accelerating data warehouse planning, design, and implementation – remember – time is money.

And what happens when you're three months into a major data sourcing and transformation effort and the needs of the business change? The cause could be a merger or acquisition, or maybe it's a new competitive pressure causing a change in the business strategy. The Teradata DIR model supports the 'what if' type of analysis to proactively plan changes necessary to keep the integrated data warehouse in line with the goals and strategies of the business.

Teradata Data Integration Roadmap Model

The Teradata DIR is a visual model of an organization's linkage from data to decision. It depicts the relationships between corporate strategy, business initiatives, business questions, business metrics, and the underlying data infrastructure (as embodied in the data model). The Teradata DIR model brings a disciplined, methodical approach to attacking the information needs of the organization by offering a model for the organization to follow.

Let's go into more detail about how the Teradata DIR model is constructed, and how it can build the linkage from the highest strategic levels of a company down to the basic business facts as captured in operational data. The following description is a high-level overview of the roadmap, and primarily describes the linkages.

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Figure 1 shows the major areas represented in the Teradata DIR model including:

- > Corporate objectives and strategy
- > Business improvement opportunities
- > Specific products and services from Teradata that support the model
- > Business questions
- > Key performance indicators (KPIs)
- > Integrated data model

How is the Teradata Data Integration Roadmap constructed, and how can it build the linkage from the highest strategic levels of a company down to the basic business facts as captured in operational data?

The following description is a brief, high-level overview of the roadmap and primarily describes the linkages. Please contact your Teradata representative for more detailed information.

The upper left portion of the model captures a typical customer's vision, the linkages to the goals for achieving that vision, and strategic objectives linked to the goals they support. A relative weight is identified for each goal. The weight of the goal is then used to calculate a weight for the strategic objectives. The strategic objectives are decomposed into more granular Business Improvement Opportunities (BIOs), which identify specific areas of the business where additional business

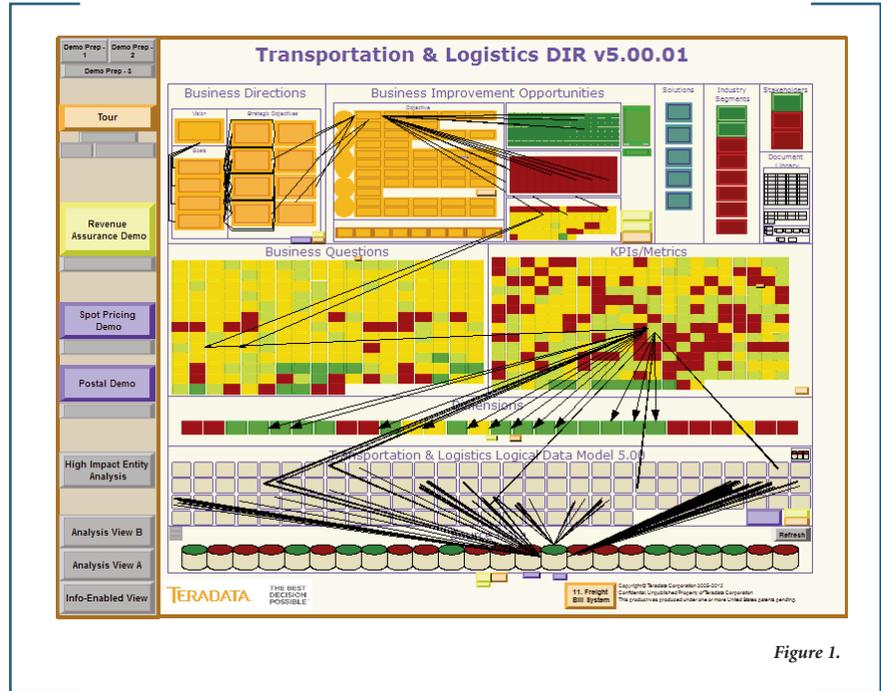


Figure 1.

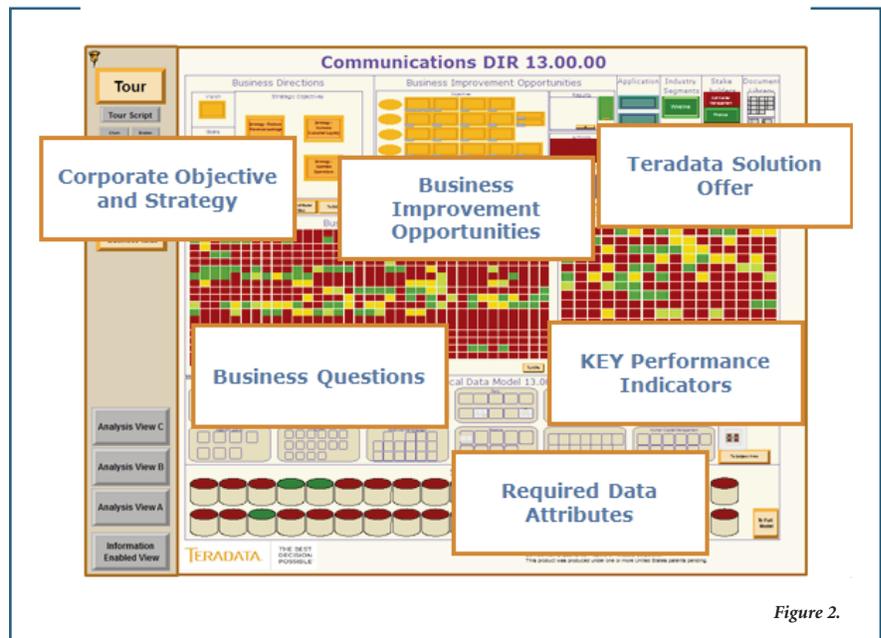


Figure 2.

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value or business impact can be achieved from the integrated data warehouse.

A Business Improvement Opportunity comprises four topics:

- > Objective(s)
- > Analysis on detailed data to convert it into actionable information
- > Business actions based on that information
- > Results

A primary assumption of the Teradata DIR model is that incomplete sources of data will cause less than perfect production of actionable information. Incomplete analysis leads to imperfect actions, and, therefore, generates less business value. As the data sources are enriched, the information improves, supporting higher value/ lower costs and generating higher value.

The model determines value through linkages from the BIOs to the data sources.

The first link in this path is from the BIOs to Business Questions and Key Performance Indicators. They're related to the supporting data identified in the bottom section of the model in the LDM. From the business perspective, the LDM is structured as a set of subject areas, represented in the model as the taupe containers. The LDM is then linked to the appropriate data sources which are identified as being sourced or not sourced into the integrated data warehouse. In the model, a Business Question or KPI that is not fully sourced is shown as red, yellow, or light green depicting the current level of sourcing completeness. Once all of the necessary attributes are sourced, the color changes to dark green. This information is passed up to the BIOs to calculate the value based on the amount of available information.

The DIR models are pre-populated with example BIOs, business questions, KPIs,

and data sources and the corresponding Teradata industry LDM, Teradata consultants can help you use this intellectual property to drive better planning for your integrated data warehouse to drive more value for your business. There are eight industry-specific models currently available. They support the retail, communications, financial services, insurance, travel, transportation logistics, manufacturing, and healthcare industries. More industry-specific models are planned.

Teradata Integrated Logical Data Model

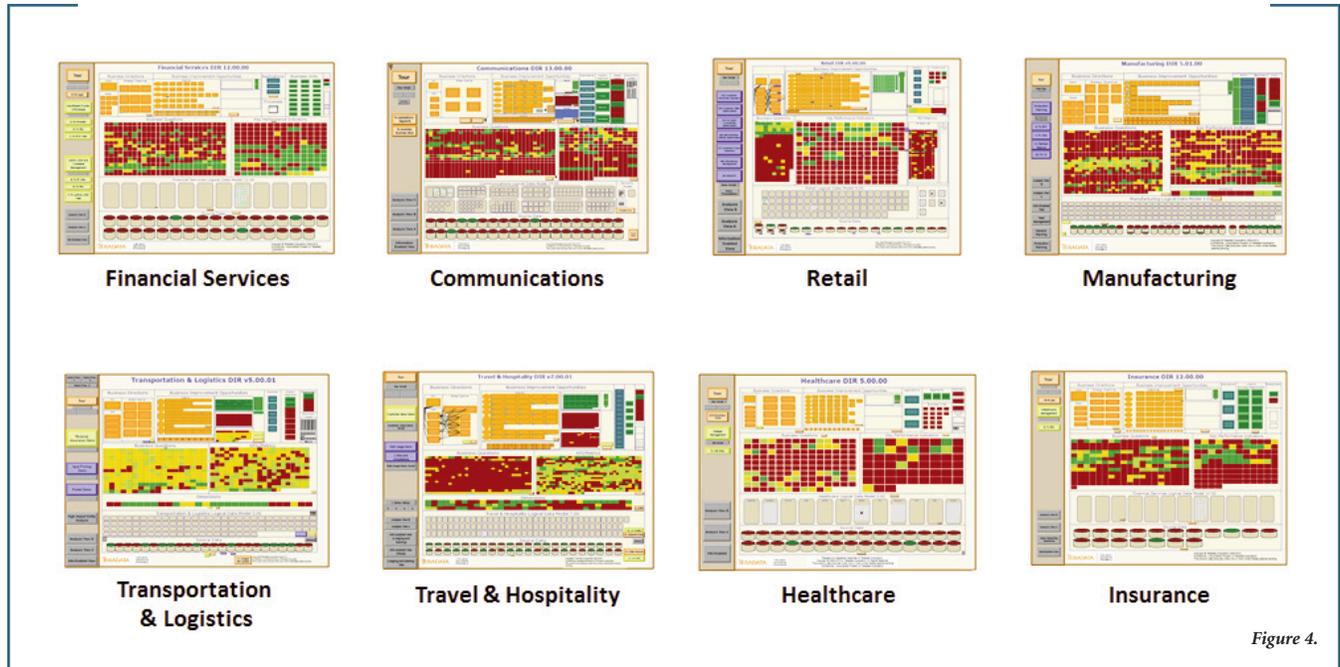
Just as the name states, Teradata LDMs are a model of the company's data, data relationships, topic areas, and business rules relating to corporate IT. Teradata LDMs offer an integrated, single view of the business that allows business and IT users to communicate about information needs and systems. The integrated logical data model is a picture of all of the pieces of information necessary to run the business.

Generally speaking, a model is an abstraction and reflection of the real world. Modeling enables us to visualize what we cannot yet realize. It is the same with data modeling. Diagrammatic tools are used in the analysis of business requirements and in the design of the resulting data structures. A modular structure is used in the logical data model to share common modules across industries and business disciplines.



Figure 3.

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A company's corporate data contains a record of all business activities, resources, and results of the organization. The data model is a well-organized abstraction of that data. So, it's quite natural that the data model has become the best method to understand and manage the business of the organization. Without a data model, it would be very difficult to organize the structure and contents of the data within the data warehouse.

When building an integrated data warehouse, you will always come to the point where a decision is needed about how the data are to be structured to support the analysis and decision making processes. This is, after all, one of the most fundamental concepts in data warehousing and what differentiates it from the more

typical operational database and decision support application building. The structure is determined through data modeling. Everyone will have to develop a data model; the decisions to make are how much effort to expend on the task and what type of data model should be used.

Both the Teradata DIR model and LDMs address the level of effort and investment. From a cost versus benefits standpoint, it's a win/win situation. At the same time, expenditures are slashed because data only has to be collected once, a single integrated view begins to take shape. Businesses save money because extra resources don't have to be spent, and data marts don't have to be built. As insights are amassed from various sources, data can be related in previously unconsidered ways to glean

additional wisdom. The models facilitate rapid understanding and alignment of the business needs and support the what if analyses of the different approaches. As the data warehouse evolves, the roadmap assists in identifying the next most valuable data to source.

Benefits of Combining the Roadmap and Logical Data Models

The following sections highlight some of the features and benefits that can be realized from implementing both the Teradata DIR model and LDMs.

Vision

An organization that undertakes the design and use of a data warehouse has a vision of where it's headed and what it wants to

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accomplish. Teradata provides products and services that can help you see your business as never before. Two rich offers that are available to build toward the vision are the Teradata DIR model and LDMs. They're grounded in solid technology, but their primary purpose and contribution to value are the accurate, concise definition of the entire data warehouse as a powerful analytical capability in support of the company's strategy, goals, and business initiatives.

Enterprise Decision Making

If one of the purposes of the integrated data warehouse, as supported by the Teradata DIR model and LDMs, is better decision making, those resultant decisions are only as good as the data upon which they're based.

The Teradata DIR and LDM approach ensures better data are used for decisions. Data are cleanly stored once with proper integration, access controls, quality checks, full attribution, and integrity constraints. Not only does this mean better data for fact-based, data-driven decisions, it means greater value for the business as it seeks to turn its information assets into decisions and actions.

Roadmap

A roadmap supplies important information to anyone embarking on a journey. Data warehouse design, implementation, usage, and ongoing operation are the steps in a journey. Journeys have a starting point and an ending point with a pathway linking the two. The Teradata DIR model and LDMs are valuable signposts and

navigation aids to help you understand clearly the start point, end point, and the route you should take.

Industry Focus

As the recognized worldwide leader in data warehousing, Teradata has worked with many of the Global 2500 firms across a variety of industries. Our consultants are steeped in industry expertise that is shared with clients and enhanced through joint projects with them. This expertise is captured in the Teradata DIR and LDMs and conveyed through engagements at the client sites. Clients derive value from this approach because they can use Teradata's personnel, skills, accumulated knowledge, and extensive designs to get results faster and with less effort than home-grown alternatives.

In addition, the Teradata DIR model and LDMs are built around the concepts of storing full details about integrated data (details about the data) and using the details of operational transactions (detailed data) to provide the foundation for enterprise analytics and enterprise intelligence.

Think Big, Start Small

Data warehouse projects can be large undertakings, but with the framework of the Teradata DIR model and LDM, they can be broken into manageable projects. The framework allows the organization's business and IT planners to think big in their vision for the goals of the data warehouse, while also starting small in selecting manageable areas upon which to focus. The beauty of the models lies in their flexibility to co-mingle emphasis

on strategy, business initiatives, business questions, business metrics, and the necessary infrastructure. A planner can begin his or her analysis at any point in the models and maneuver around within the framework.

Reduced Risk

Conscientious enterprise management looks to minimize risks in technology investments. The Teradata DIR model and LDM are a valuable combination because they require less invention (through reuse), less trail blazing, less work, and fewer changes than alternative approaches. Less disruption, effort, work, and risk lead to fewer errors which also enhance value by minimizing the costs of rework.

Rigorous Analysis and Thinking

Building integrated models requires disciplined, thorough, and unambiguous analysis about the current and future data needs of the business. Teradata experts have already done this analysis and included the results in the Teradata DIR model and LDMs. Organizations can benefit from this clarity of purpose because they don't have to worry about incomplete, random, confusing, or conflicting designs that might have sprung up from other approaches (e.g., data mart efforts, no integrated data model, or incoherent frameworks).

Time, Resources, Scope

Most technology managers understand the three main levers they can alter to affect the outcome of a project – time, resources, and scope/content. Often, these levers, which have associated costs and risks, are used when a project gets into trouble.

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It's easy to understand extending the time, putting more people and resources onto a project, or reducing the scope of tasks to achieve success. Using the Teradata DIR model and LDM infuses best practice approaches into the data warehouse design so these levers don't have to be used as frequently. Imagine the benefits of not having to resort to such tactics.

Time to Value and Time to Usage

The Teradata DIR and LDM models accelerate the implementation of an integrated data warehouse – but fast is supplemented by getting it right at the right level of resource investment. By using the models, an organization generates value from its data warehouse sooner (shorter time to value) and adds value by increasing the access and usage across the organization sooner (time to usage).

Models are Representations

A model, any model, is a representation or mock-up of something. The Teradata DIR and LDM are models that show how the enterprise business and technology architectural underpinnings might look. This prospective view is valuable because it allows decision makers to assess the utility of the architecture before committing resources. Value is achieved with less effort and with lower investment of people, time, and money.

Specialized Skills

The Teradata DIR model and LDMs are unique and valuable because they allow an organization to leverage Teradata's expertise to get a head start on data warehouse

design, construction, and use. An organization that undertakes its own model development efforts needs a unique set of skills that might be expensive or difficult to obtain, such as:

- > Broad industry experience at each level.
- > Enterprise architects.
- > Senior data modeling expertise.
- > Extensive DBA expertise.
- > Integration of the efforts of data modelers, architects, and DBAs.

Improved Communication between Business and IT

The documentation surrounding the Teradata DIR model and LDMs captures the intentions of business and IT users. In doing so, the models reduce the possibility of costly miscommunication and misunderstandings. There is real value in aligning the three directions of communication (i.e., up the organization structure, down the organization, and across the enterprise).

Single, Integrated View

A data warehouse is subject oriented according to its formal definition – this means that the corporate lines of business have multiple subject areas that need to be integrated for maximum benefit. Imagine the issues of dealing with multiple definitions and data values for customer or product. The Teradata DIR model and LDM address this by employing an integrated view of data, architecture, and scope.

Load Once, Use Many Times

The Teradata DIR model and LDMs support the concept of load once, use many times, which means that facts are

collected in one central location and made available for multiple uses across the enterprise. Two benefits come from that action. First is that the cost of harvesting and cleansing the data is only incurred once. The second is that an integrated view of the data can be supported. At the same time, expenditures are slashed because data only has to be collected once, and a single integrated view takes shape. Organizations save money because extra resources don't have to be spent and because new data marts are unneeded. Additionally, data reuse and access allows concurrent initiation (rather than serialization) of multiple projects with less risk.

Top-to-Bottom Model, and Back

The Teradata DIR model is easy to use because its design can be viewed from either a top down or bottom up perspective. The top down view starts from the strategic view and evolves to the tactical, whereas the bottom up view starts from the detailed, tactical view and works upward to the summary, strategic view. This flexible approach is valuable because an organization can pick its own start point, end point, goals, and path to success.

Another way to look at the model is from the bottom up. By understanding what data are readily available from the operational support systems, you can identify what actionable information can be created.

Impact Analysis

Teradata DIR models and LDMs allow an organization to design, plan, deploy, analyze, measure, and manage its data warehouse efforts – all in the context of a

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framework or roadmap. Thorough understanding of the data warehouse allows an organization to generate value by assessing the impact of new business initiatives, forecasting new demands, and assessing and planning an orderly evolution of the data warehouse. Alternatively, an organization will expend considerable time and effort without such capabilities.

Don't Try This at Home

Popular media has contributed the phrase “don't try this at home” to indicate when trained, experienced professionals are attempting something within their range of skills, but is likely to cause adverse effects for the unskilled. The same is true for less-skilled data warehouse personnel who undertake a data warehouse project without proper skills, equipment, and knowledge – the result is these home-grown efforts may be off target. Teradata consultants are skilled professionals who can implement the Teradata DIR model and LDMs to the benefit of the organization.

Ready-made, Complete Solutions

The Teradata DIR model and LDMs provide benefits for those organizations that want to gain value quickly. These benefits are achieved because the models contain dozens of business initiatives, hundreds of business questions, and hundreds of metrics (depending on the specific industry) that are fully usable once data are mapped to the model. Teradata expertise makes this possible.

Graphics and Visualization

We've all heard the phrase a picture is worth a thousand words. This phrase supports the idea that the Teradata DIR model and LDM provide a visual representation of the enterprise business and technology complexities. The Teradata DIR model and LDM provide value by improving enterprise understanding, alignment, and communication.

Less Maintenance

Any time a common, integrated approach (as embodied in the Teradata DIR and LDM) is used, there is the assurance that less effort will be required to maintain and extend underlying systems. This is especially true for integrated data warehouses. As stated earlier, time is money. Consequently, lower time, effort, and resource expenditures for maintenance, enhancement, and extensions yield higher value. This allows the organization to shift to a mode of anticipating business needs rather than reacting to changes.

Artful Capabilities

Figure 5 illustrates how value can be derived in two interesting ways from the use of the Teradata DIR model and LDM. In the lower left quadrant, an organization needs help if data are unavailable, and it doesn't know what business questions it wants to answer. In the upper right quadrant, an organization has data available for known business questions. These two quadrants are interesting, but more compelling value can be derived from the other two quadrants (labeled by “art of the possible” and “art of the necessary”). In the upper

left quadrant, an organization gains value from an ability to ask and answer new business questions with available data (“art of the possible”). In the lower right quadrant, an organization gains value from an ability to identify and source new data that allow it to answer known business questions. These capabilities are enabled by the combined Teradata DIR model and LDMs.

The next step involves understanding how the Teradata DIR model and LDMs are used for planning, understanding what business analytics an organization already has built, and identifying existing analytic components that can be assembled for reuse. The DIR models have pre-built analysis scenarios that allow you to address these areas.

Customization

The Teradata DIR and LDM are excellent bases from which an organization can evolve and extend the value of its data warehouse in unique ways. A flexible model provides value by allowing an organization to customize the initial models to its own business and industry. The Teradata DIR and LDM allow organizations to define their own business strategy, objectives, plans, metrics, and foundations using their own data and infrastructure – all while leveraging Teradata's expertise.

What Versus How

When designing an integrated data warehouse for use, it's important to understand what business problems you're

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trying to solve. Too often technology proponents lose sight of the business issues by focusing on how to solve a problem. The Teradata DIR and LDM combination provides value by ensuring a business-driven perspective to data warehouse design and usage – with a balance of IT support for the outcomes.

Extensive Benefits

Examination of the above topics shows numerous benefits that can be realized by implementing the Teradata DIR model and LDMs. Who else would you select to do this but the worldwide leader in data warehousing?

Proven Value and Expertise

What makes Teradata different from the competition when it comes to data warehousing? It's the business value and the

industry expertise that we can provide. We can help your business and IT functions collaborate and agree on the requirements for meeting business objectives and managing data assets better. With more than 25 years of experience, Teradata is the market leader in data warehousing, and we've built that expertise, best practices, and intellectual property into our tools. And we've long supported integrated, centralized data warehouses under some of the most demanding environments.

Leadership You Can Trust

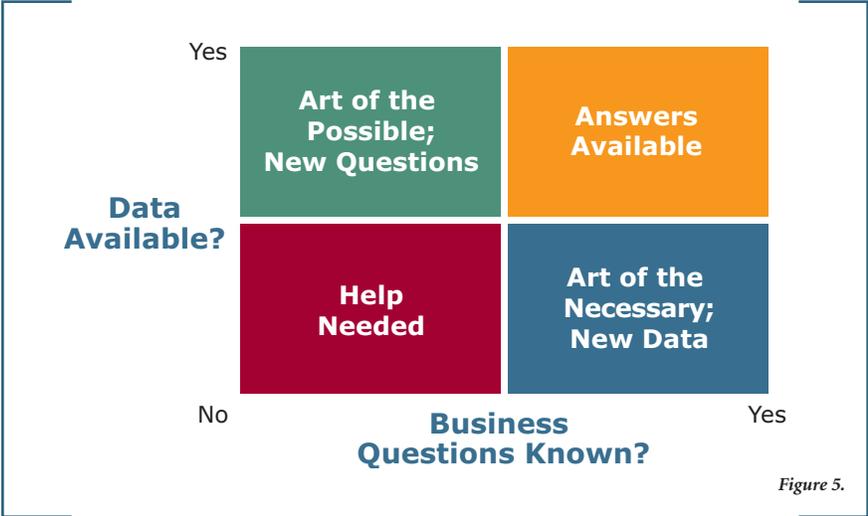
Teradata consultants understand the problems and critical success factors associated with data warehouses better than anyone else in the industry. Through data warehousing, customer management, financial management, and other applications, Teradata can help you drive revenue and increase customer loyalty. We also

deliver the right people, products, and services that can help you make your data warehouse solution even stronger.

Teradata Services consultants, for example, guide your data model development and help you plan and develop applications that will support your business needs. They can work with you to prioritize and translate your business issues and direction into an effective data warehouse strategy that delivers the strongest ROI. And, Teradata Corporation has a built-in foundation of industry knowledge, consulting expertise, global customer support services, and world-leading hardware technology – a combination of strengths unmatched in the industry. Teradata brings you the power to proactively manage your business. And Teradata solutions help provide analysis to expedite fast, accurate, and consistent decision making across your enterprise. We can help you integrate data from every corner of your organization.

For More Information

To find out more about how the Teradata Data Integration Roadmap Models and Logical Data Models can help you align analytical capabilities across your organization, contact your local Teradata representative or visit Teradata.com.



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