Data Orchestration at Hyperscale

In recent months, big tech has overtaken big oil to become the mainstay of the modern economy. How did they do it? Data orchestration and monetization at hyperscale. Hyperscale enterprises leverage orchestration to become data native and accelerate digital transformation.

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Data native organizations accomplish this with a modern data analytics platform that enables companies to hyperscale their business. This capability supports business models and the large, complex data sets of the future. It can help drive customer retention, business support, growth opportunities, and value at a scale that's never been achievable before outside of big tech.

"Digitization is upending many core tenets of competition among industries by lowering the cost of entering markets and providing high-speed passing lanes to scale up enterprises," according to McKinsey. "At the extreme are hyperscale businesses that are pushing the new rules of digitization so radically that they are challenging conventional management intuition about scale and complexity."

Enterprises of the future need to find new and profitable use cases for all their data in order to be competitive. And they need the data analytics to make this a reality—data analytics orchestration at hyperscale.

Hyperscalability is Essential for Current and Future Enterprise Needs

Enterprises of the future need the ability of modern data architectures to grow to meet increased demand. To become a hyperscale business, the data analytics platform must scale to support trillions of interactions per month, millions of models, and more than 100 million queries every day. Hyperscale businesses have billions of users, customers, and connected devices. The billions or trillions of interactions and data points benefit organizations by allowing events with only a one-in-a-million probability to happen several times a day.

"Hyperscale companies achieve tremendous operating leverage, with process automation driven by algorithms," McKinsey notes. "Digital platforms can instantly conduct experiments across a base of millions of interactions."

The ability to hyperscale lets organizations get answers faster. For example, companies can experiment with different marketing approaches or service bundles and quickly identify which ones offer the highest revenues or best resonate with customers. The size, speed, and

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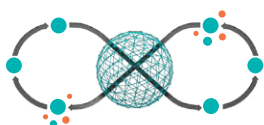
connectivity of hyperscale businesses are self-reinforcing, providing an effective way for enterprises of the future to gather rapid feedback and drive greater growth.

Unlock Possibilities with Orchestration at Hyperscale

Orchestration ties together data, analytics, and processing at hyperscale. It automates data-driven processes across the enterprise. This includes the preparation, management, and integration of all available data. Leadership can then make informed decisions based on data analytics, then take actions based on those decisions.

The orchestration process spans multiple systems, functions, and types of enterprise-wide data. The process allows interconnected workloads, repeatable processes, and operations to become streamlined and simplified.

An intelligent data analytics platform with end-to-end data is the backbone that ultimately drives competitive business advantage. This type of platform performs analytics across all data, including complex data sets in the cloud or on-premises, putting companies in the best position to grab more market share and increase profitability.

Say No to Data Silos, Yes to Data Orchestration

A common problem in most companies is data sitting in silos. Some organizations may have hundreds or even thousands of individual and departmental silos strung out across the business. Silos create a range of problems that restrict the business, such as decreasing the quality and credibility of data, siloed data is quickly outdated, and its usefulness decreases rapidly, all of which limit insights.

Getting data out of silos is critical for enterprises of the future. But it's not enough. The data must be integrated in a platform for analytics at hyperscale. This includes unifying data from data lakes and data warehouses in a hybrid cloud environment. Businesses then gain richer,
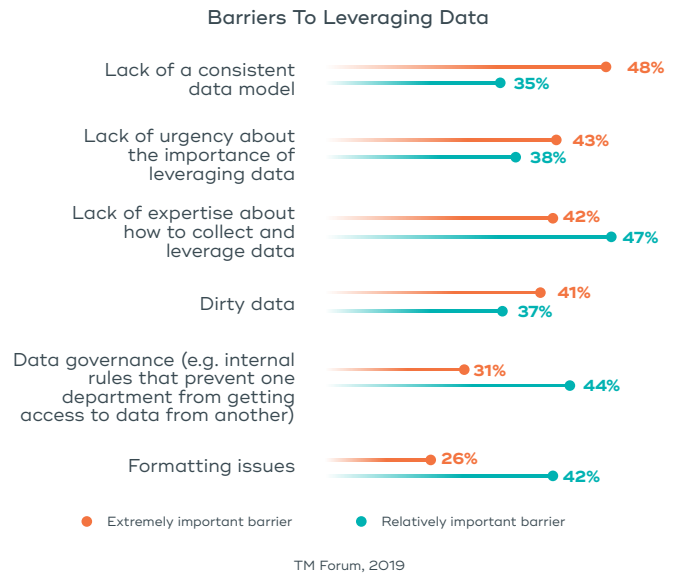
Barriers To Leveraging Data

TM Forum, 2019

Figure 1: Barriers to Accessing Data

contextual, more complete insights along with the ability to ask questions and get answers that were previously unavailable or incomplete.

Companies know they need to break down silos, yet the problem persists. The proliferation of new data and analytic tools, shadow IT departments, and the ability to quickly spin up cloud environments all add to the problem. There are also several challenges to leveraging data, with lack of a consistent data model being the top barrier (Figure 1).

The lack of a comprehensive data strategy along with the ongoing issue of silos is restricting innovation, automation, hyper-personalized marketing, and creating other problems. They include:

- **Proprietary data assets are not shared across teams.** An individual team may not be able to identify or understand which insights may be useful to another team.

- **Non-distributed and unshared knowledge.** As companies bridge the gap between technology-centric and business-centric decision making, access to better information about all aspects of the business is essential.

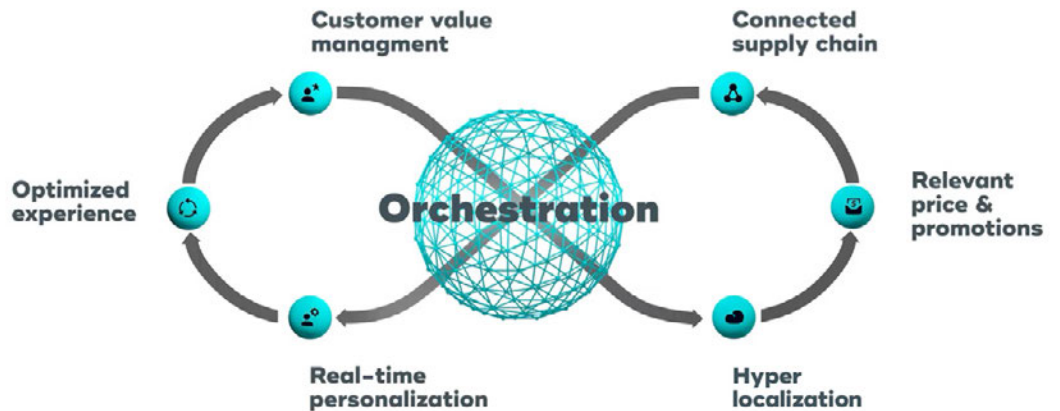teradata.

Retail end-to-end orchestration at hyperscale

Figure 2: Orchestration at Hyperscale for Retail

- **Inefficient architecture and systems.** Solutions developed for single use cases are unlikely to take into account the benefits of deploying technologies and processes that can support other use cases. This leads to high costs, both financially and when future-proofing the business.

- **Inconsistent databases and analyses due to differing definitions for data objects.** Various departments within the organization have their own technology partners and systems that are likely to use proprietary approaches. This makes it difficult to port data across the enterprise. Organizations should focus on building capabilities that support current and future use cases equally well on a single platform using common data and analytic tools.

Drive Automation and Process Improvements Across Industries

Data orchestration at hyperscale automates processes to convert data into results, improves customer experiences, and drives operational excellence. The right side of a data orchestration infinity loop drives customer excellence and focuses on the consumption chain and the selling and service value streams. This includes business essentials such as customer experience, marketing, personalization, digital transformations, and asset utilization.

The left side of this loop is operational excellence and focuses on the internal value chain and the creation and production value stream. This includes things like supply chain, finance management, performance management, operations management, regulatory, and safety compliance.

Bringing together all these processes through data analytics is what drives hyperscale and competitive differentiation. Figures 2 through 5 feature infinity loops. They show how data orchestration is a continuous, sustainable process that delivers ongoing value to industries.

The orchestration highlighted in the infinity loops brings together all processes, including data analytics at hyperscale. It creates opportunities across all types of businesses:

Retail

To adapt to the modern digital economy and deliver cost-effective revenue growth, retailers of the future must transform the way they execute operationally and interact with customers. They need to deliver:

- Hyperpersonalized, frictionless customer experiences across all channels

- More relevant localized and personalized value propositions

- Agile, cost-efficient operations that can respond to the demands of the customer of the future

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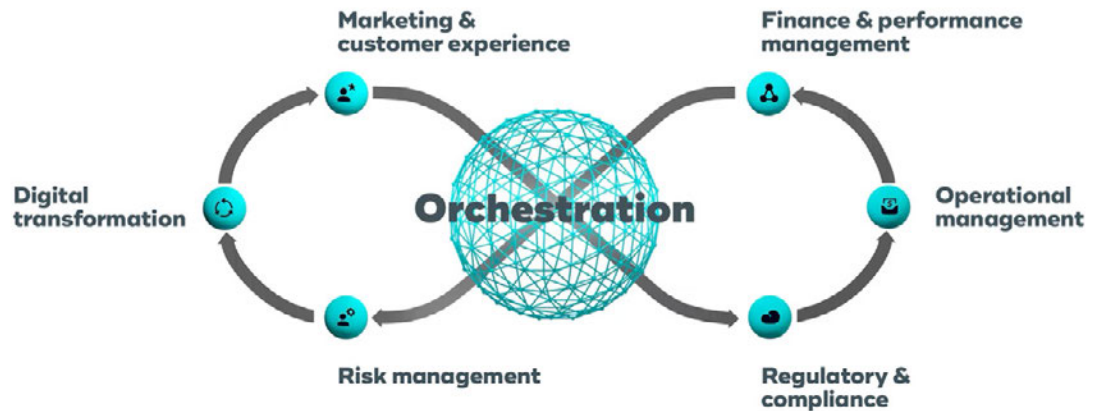**Financial Services end-to-end orchestration at hyperscale**

Figure 3: Orchestration at Hyperscale for Financial Services

All of these are critical for delivering competitive differentiation and increased customer loyalty and satisfaction. Data and analytics, orchestrated by a data platform that provides a single, connected, and detailed view across the entire business, are the key enablers for these capabilities. In addition, an orchestrated data platform provides a foundation to transform business processes and ways of working through automated insights integrated into operational solutions.

This orchestrated data platform is critical for retailers of the future to harness their data to manage the scale, complexity, and pace of change that is inherent in modern retailing. These challenges will grow exponentially as retailers increasingly interact with each customer individually in real time and dynamically manage range, pricing, and promotions in each store. The demands on supply chains will also increase exponentially to deliver the speed and responsiveness customers and the market demand, and it must be done in the most cost effective way possible.

Telcos

Telcos of the future will closely resemble a technology company. That's because technology companies see data as an asset that is at the core of all their operations and decision-making processes. This is what telcos must follow in order to be successful.

One focus area that delivers immediate benefits across telcos is the utilization of integrated, operationalized

analytics to roll out the next generation of fixed and mobile networks at a segment of one level. This enables telcos to personalize capacity, service levels, products, and services to a single individual. Advanced analytics also enable telcos to dramatically improve the customer experience and extend world-class levels of personalization across all touchpoints and channels to engage, retain, and delight customers.

Outcomes include high-impact financial results and double digit NPS improvements, which can result in hundreds of millions of dollars in additional revenue. Incremental benefits can also be harvested from the subsequent decommissioning of older network technologies and the consolidation of data stores as they become redundant as a result of the centralized orchestration capability.

With smart decommissioning, telcos can remove old technology like 2G or 3G, or specific network equipment that is restricted by regulations in some countries. This strategic transitioning must be done in concert with a smart network rollout. Understanding when and where the rollout should take place in terms of customer experience should be aligned with smart customer value management to capture new upsell and cross-sell opportunities.

This approach ensures that customers have 5G-enabled devices and the telcos can use customer insights to understand personalized offers that lead customers to

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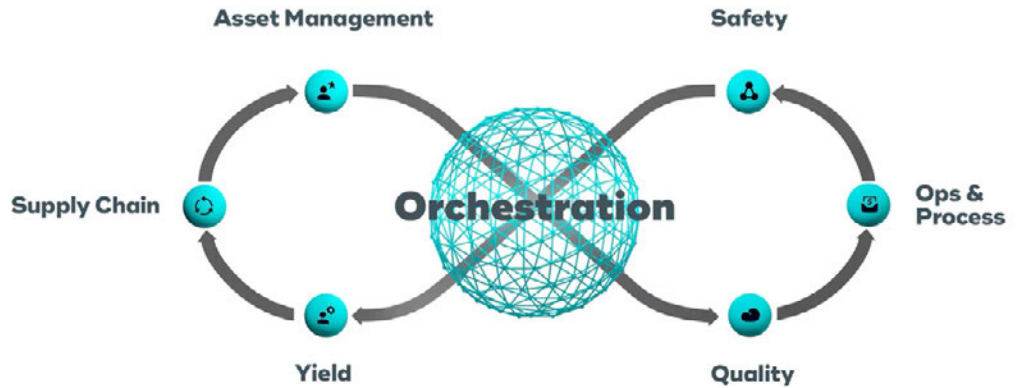Manufacturing end-to-end orchestration at hyperscale

Figure 4: Orchestration at Hyperscale for Manufacturing

upgrade their services, which further assists with the decommissioning efforts. The efforts produce a high return on investment and increased NPS. They also facilitate a much smarter network optimization that is based on customer value rather than on customer density and utilization—a subtle but increasingly critical shift in thinking and a more customer-centric approach that can also release valuable spectrum for reuse in new technologies.

Financial Services

Financial services companies of the future will have to compete against hyperscale tech companies moving into their space—at a rapid speed. For example, Google is interested in banking not because it's where the money is, but because it's where the data is. Google has grown quickly by understanding how to monetize data as a valuable business asset.

Financial services companies of the future need to focus on four key areas. They must:

- Develop customer experiences that replicate the branch model of knowing the customer and undertaking a dialogue across sales and service topics
- Rapidly respond to changes in risk factors both on an individual basis and as changes occur systematically to deliver sustainable growth
- Automate all repeatable processes to maintain a lean and efficient organization

- Meet regulatory compliance standards and maintain a healthy balance sheet

To meet current and future challenges and identify new opportunities, banks and other financial services organizations need a connected and orchestrated view of all their data at scale. How might this differ from today? As an example, developments in regulation are driving a move from sending reports monthly or quarterly to pushing data in real-time to the regulator. In addition, the need to understand and react to external disruptions or threats such as a pandemic mean that the widespread historic reporting cycles are no longer sufficient to manage a business that functions on real-time monetary flows.

The threat from companies like Amazon and Google is that they offer customers personalization. If a company like YouTube knows enough about a user to curate music and entertainment content, then consumers and business will expect banks to bring the same level of expertise to their finances.

All this innovation needs to be combined with an increasing acceleration of automation. From guiding users through an online loan application to alerting them to suspicious activity on their accounts, financial services companies of the future must distil processes down to the lowest level of human intervention that is consistent with an excellent experience. Processes will become analytically-driven and human-augmented rather than human-driven and analytically-augmented.

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Healthcare and Life Sciences end-to-end orchestration at hyperscale

Figure 5: Orchestration at Hyperscale for Healthcare and Life Sciences

Financial services companies of the future need to increasingly open their data analytics environment to customers and partners. This enables innovation in data-driven services and processes across the entire ecosystem.

Manufacturing

Manufacturers of the future must take full advantage of all data available to them—not only from equipment sensors and operational systems, but also from the IT world of asset management systems, finance, and procurement systems. This includes data from partners in their supply chains and myriad other sources. They must use data analytics to improve safety, drive increased automation across processes, better predict and prevent potential equipment breakdowns, and find increased efficiency in their global supply chains.

Optimizing advanced analytics, including artificial intelligence (AI) and machine learning, can help control operational costs. They can also improve maintenance regimes to prevent unplanned shutdowns, minimize waste, increase efficiencies, drive operational excellence, and enable many other benefits.

Integrating all data from operational systems, inventory, supply chains, customers, and back office sources such as finance gives leadership a unified view of the entire company for the first time. This is increasingly critical for manufacturers of the future that must be agile and prepared for rapidly changing demands.

"With 65% of manufacturers saying market uncertainty is the challenge they're most worried about; maintaining revenues and profitability is top of mind," according to Forbes.

Evolving to digital processes and implementing modern analytic capabilities such as AI and machine learning can accelerate innovation. They allow manufacturers to address their key goals of safety, efficiency, profitability reliability, and quality in ways that were previously impossible to achieve. To accomplish this, manufacturers of the future need a modern platform capable of data orchestration at hyperscale.

Industry 4.0 is bringing increased connectivity, advanced analytics, and further automation to factories around the world. It is also bringing new data at an unprecedented scale. Understanding, valuing, and optimizing the use of this data is the key foundation to enable manufacturers of the future to increase adoption of new technologies, boost productivity, design products to meet changing user preferences, and make the most informed buying and pricing decisions in addition to many other transformational opportunities.

Healthcare and Life Sciences

The future of healthcare is data centric. Whether researching promising compounds for drug therapies, developing vaccines to prevent the next pandemic, informing medicine's evidence base, or optimizing value,
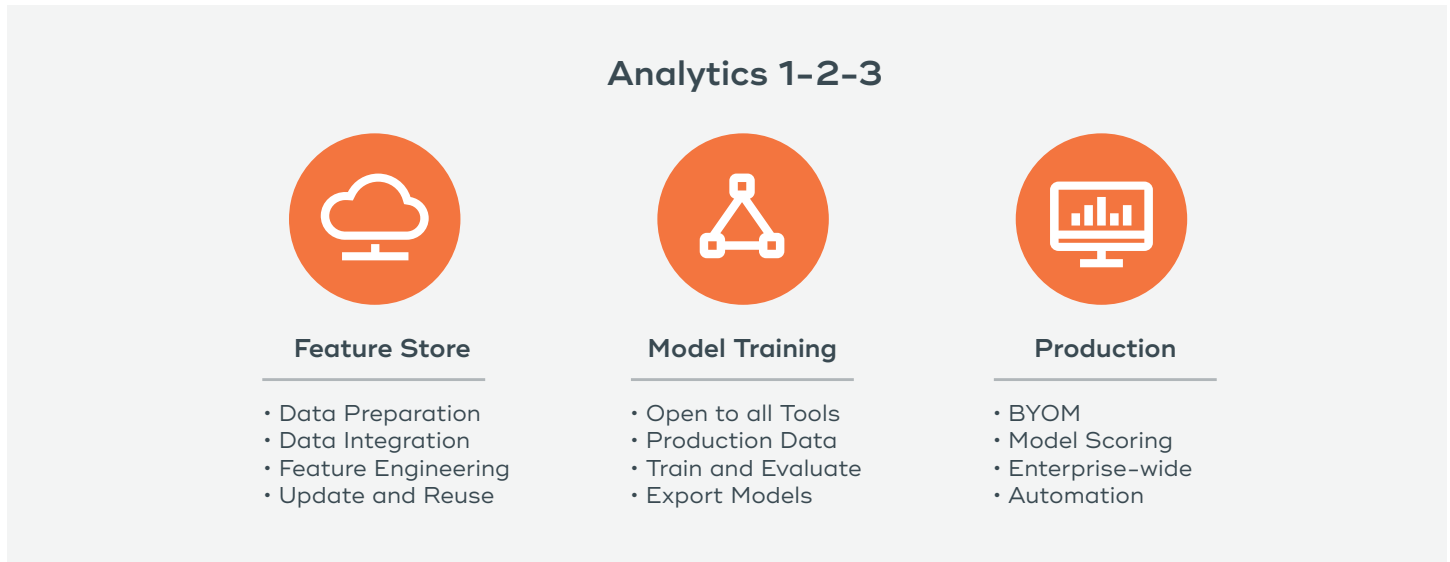
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Analytics 1-2-3

Feature Store	Model Training	Production
• Data Preparation • Data Integration • Feature Engineering • Update and Reuse	• Open to all Tools • Production Data • Train and Evaluate • Export Models	• BYOM • Model Scoring • Enterprise-wide • Automation

Figure 6: Moving Analytics into Production at Scale

quality, and the patient experience of care, data is the fuel of healthcare and life sciences' future. Analytics is its engine.

As cost pressures and legislation drive ever greater collaboration, interoperability, and individual control of a person's own healthcare record, the industry is evolving to improve data management and leverage analytics at scale. This allows healthcare and life sciences of the future to:

- Ensure care is both appropriate and high-quality to drive better patient outcomes and fulfill the promise of value-based care programs

- Modernize and digitize the individual experience, meeting people on their terms with timely lifestyle-friendly interactions that improve the experience of care and help encourage healthy behaviors

- Discover how therapies, drugs, genomes, proteins, and social determinants interact to facilitate truly precise medicine for an N of 1

With aging populations, more treatable diseases, growing populations of chronic condition sufferers, and increasing regulations, all against the backdrop of more frequent epidemics and pandemics, healthcare and life sciences of the future will only thrive with comprehensive

strategies. These strategies must be served by secure data supply chains, quality data integration, and easy, scalable access to analytics that continuously improve and evolve to address this dynamic industry. This means orchestration at hyperscale is essential.

How to Orchestrate Processes, Data and Analytics

Teradata's modern hybrid data analytics platform, Teradata Vantage™, delivers the ability to scale data management and analytics. Vantage provides the entire enterprise with the advanced capabilities required to run millions of productionized models, on trillions of interactions, every second of every day—all at a granular customer, product, and monetary level.

Teradata offers interlinked analytics that run on tightly integrated data. This ensures that business processes are truly data driven and demonstrate constant, consistent improvements in business outcomes.

Leveraging data as an asset is not always easy. Many attempts fail when analytics move from the lab to production. Teradata's advanced analytics capabilities don't have that problem. They have been designed to take advantage of Teradata's robust underlying

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Data Volume
Petabyte scale of raw user data stored in the same system

Query Concurrency
The volume of work which can be done at the same time

Query Complexity
Ability of the system to handle complex multi-join queries

Schema Sophistication
Extensible and flexible data schemas that suit any business requirement

Query Data Volume
Volume of data that can be processed against a single query

Query Response Time
Ability to deliver consistent response times to comply with strict SLAs

Data Latency
Ability to load data and update subject areas in near real-time

Mixed Workload
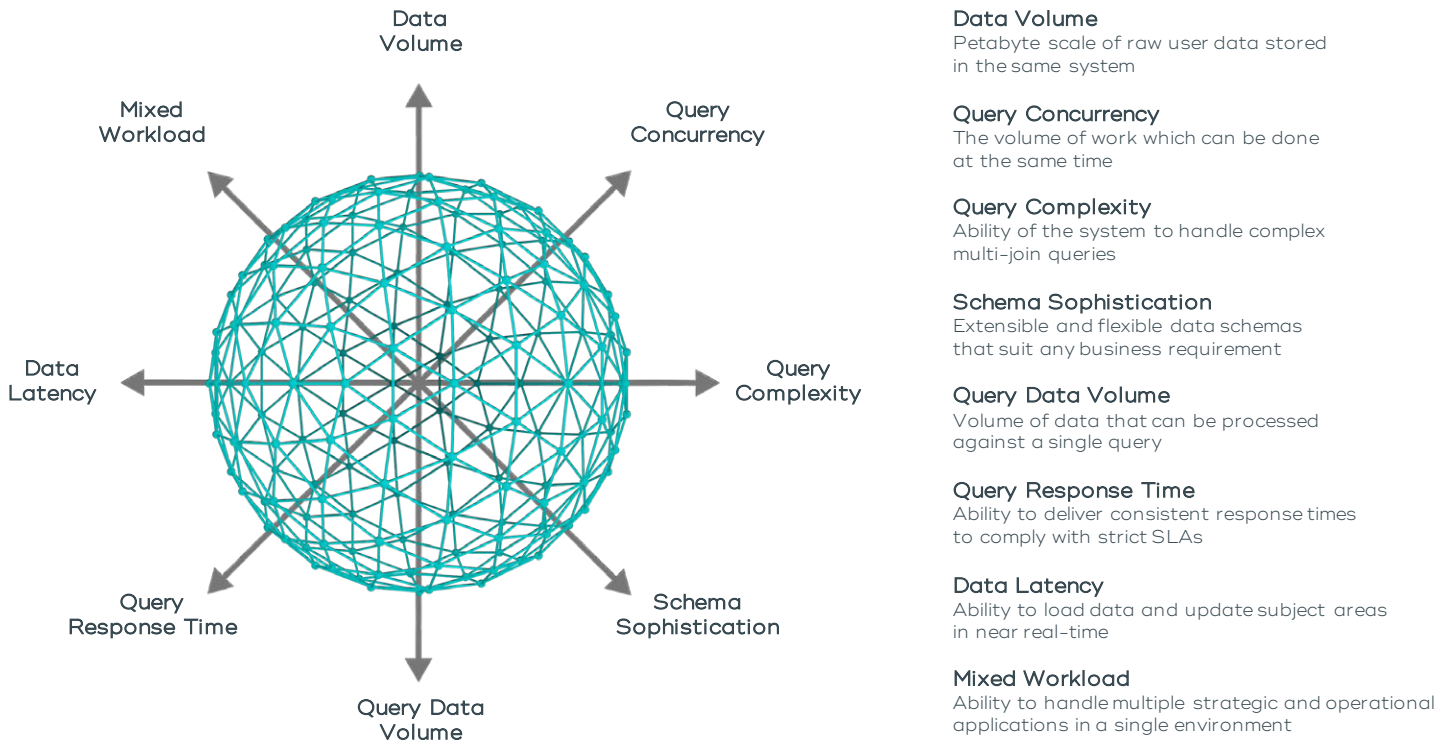Ability to handle multiple strategic and operational applications in a single environment

Figure 7: Teradata's Multidimensional Scalability

technology that can manage, prepare, and execute analytics on an enterprise scale that has never seen before (Figure 6).

This orchestration capability delivers significant benefits. The data asset rapidly becomes more valuable than the network, stores, and even the capital reserves.

Teradata Differentiators Include Multidimensional Scalability

When data is harnessed, it's a company's most valuable corporate asset. Investing in this asset is essential to the success of a business. That's one reason why data utilization is a topic for the CEO and the rest of the C-suite to understand, embrace, own, and optimize.

All employees throughout the organization need to understand the importance of data for the enterprise

of the future to become data driven. Access to data should not be restricted to a few small functions. It should be shared and used across the enterprise. Access should also be extended to customers and suppliers whenever relevant.

Teradata technology is specifically built to support companies' ability to unlock answers anywhere, scale in every dimension, and advance analytics by ensuring data is:

- **Reusable.** Store data once and use it many times—economies of scale and reusability pay dividends.

- **Scalable.** Run millions of interlinked models in production to gain improved insights and actions.

- **Integrated.** Ask more questions, get more answers, and deliver deeper insights.

- **Operationalized.** Put data to work by taking analytics to the data.

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The technology also gives organizations the key capabilities to:

- **Accelerate.** Break down barriers and ingest all data at an individual customer level.
- **Converge.** Integrate all functions and drive insights across the business.
- **Deploy.** Enable enterprise-wide access to data, continually optimizing processes and services.

A set of Teradata capabilities that enable multidimensional scalability is at the center of orchestration at hyperscale (Figure 7). Enterprises of the future can leverage Teradata Vantage to scale across eight core dimensions:

- Data volume
- Query concurrency
- Query complexity
- Schema sophistication
- Query data volume
- Query response time
- Data latency
- Mixed workload

The Future Belongs to Companies that Make Data Their Greatest Asset

Global companies already have the data they need to determine their futures by delivering the products and services customers want. Enterprises of the future will use their greatest asset—data—to create and optimize other assets. These enterprises will prioritize getting the most value from all their data.

The right analytics platform leverages data to deliver new capabilities for driving desired outcomes, uncovering new insights, and solving new and ongoing business challenges. This type of platform performs analytics across 100 percent of a company's data, at hyperscale, in the cloud or on-premise, to put enterprises is the best position to lead their industries into the future.

About Teradata

Teradata is the cloud data analytics platform company, built for a hybrid multi-cloud reality, solving the world's most complex data challenges at scale. We help businesses unlock value by turning data into their greatest asset. See how at **Teradata.com**.

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