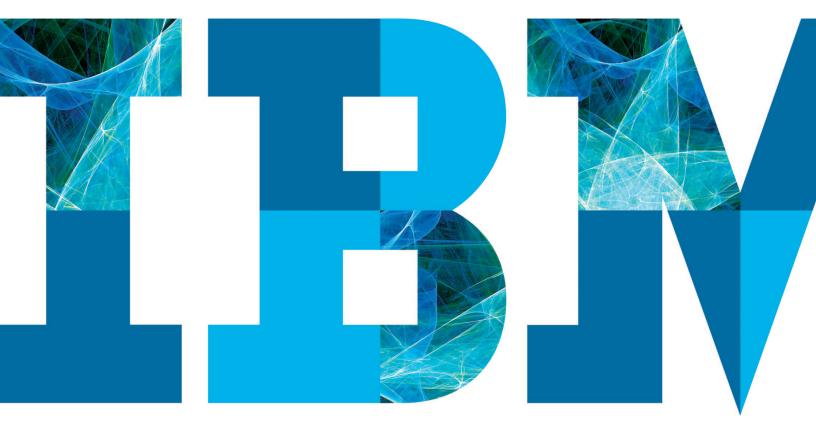# Gain vital insight from your data

IBM zEnterprise: An innovative approach to delivering business-critical analytics

The critical nature of analytics in today's business

The goal of analytics is to deliver greater insight to the business and to maximize business performance. Incorporating analytics into business applications is now essential to maintain a competitive edge. When implemented correctly, analytics help business leaders quickly identify new opportunities, respond to changing situations faster and ultimately improve competitive advantage. Research continues to demonstrate that organizations with a successful analytics strategy gain greater competitive advantage: according to a recent study by the IBM Center for Applied Insights, these organizations are seeing measurable benefits, including 1.6 times greater revenue growth and 2.5 times stock price appreciation.[1]

The ability to look four months into the future and know what our inventory levels need to be on a weekly basis is absolutely key to our success…. It allows us to adjust production to a level that reduces our exposure and still gives us the ability to supply our customer with close to 100 percent of their orders."

—Nihad Aytaman
 Director of Business Applications
 Elie Tahari

As analytics applications become embedded into the fabric of the business, users expect more from those applications—and expect that the information they receive is timely, accurate and compliant. If these business-critical analytic applications fail at any level, for any length of time, vital business opportunities may be lost and the business can suffer significantly. Therefore, strategic and IT teams must ensure the highest levels of performance, availability and scalability of their analytic tools and be confident that the data used for analytics is delivered efficiently across the organization, is of high quality and is properly governed. The inability to address these requirements can negate any competitive advantage initially gained through analytic advancements.

This white paper explores the growing focus on analytics, the inherent challenges of supporting business-critical analytics, an innovative approach to tackling analytic requirements, and how platform choice impacts a variety of business goals, including:

- Delivering timely, accurate and secure access to analytic information
- Supporting high availability, scalability and performance
- Gaining faster time-to-value through rapid deployment and expansion of analytics
- Reducing IT cost and complexity

It also discusses the value of bringing analytics closer to the data source and offers insights into how the IBM® zEnterprise® platform—and the analytic offerings that run on it—deliver a powerful, cost-competitive solution for data-driven organizations.

Mounting focus on analytics heightens non-functional requirements

With a broad, heightened demand for analytics comes an expectation that analytic applications will perform at an enterprise level. Existing solutions are being pushed to scale to support more users, as well as handle more frequent and sophisticated queries of larger volumes of data, while providing optimal availability and performance—even as usage demands fluctuate. In fast-moving business climates, knowledge workers cannot wait days or even hours for the crucial information they need to do their jobs.

When evaluating different approaches to analytics, the teams responsible for defining analytic strategies and directions must assess not only business intelligence (BI) and predictive analytics tool capabilities but also the information management foundation that these tools depend on. They must consider where information enters the business through transactional systems; how that data is moved, cleansed and managed; and which data warehousing solution best fits their needs. They must carefully evaluate not only individual product solutions but also the platform alternatives that will allow them to most efficiently access data at its source, minimize back-end complexity and reduce expenses without compromising performance and end-user satisfaction.

Inherent challenges of delivering business-critical analytics

As information enters their business, many organizations duplicate and move that data out to departmental systems for use in analytics initiatives. Transferring data from platform to platform can impact data quality and security and increase data latency (the delay in the time required to move data from its source to data warehousing applications and, ultimately, BA tools). This makes it difficult to ensure high levels of timeliness, accuracy and security.

Departmental analytics deployments may also struggle to provide the availability, scalability and performance levels needed to ensure high user satisfaction and broad adoption of analytic solutions. Addressing analytics department by department requires ongoing focus and funding by each individual project team. It also takes employee commitment: in addition to their core responsibilities, departmental IT teams must continually assess analytics capacity in relation to expanding requirements, and then fund, procure, acquire, install and manage all the new hardware and software needed to support the analytic deployment. From there, the team must define and prepare the data, and finally train and enable users.

All of these steps must be taken before the team can begin experiencing any return on investment (ROI)—and there is no guarantee that the analytics solution will stack up to demands for modern, business-critical analytics.

Analytics innovation with the IBM zEnterprise hybrid approach

A successful analytics strategy requires a portfolio of business and technology solutions that help everyone gain insight—from executives and data analysts to employees on the front line. These solutions must provide real-time monitoring, reporting, analysis, dashboards and a robust set of predictive analytics that can support smart, proactive business decisions. They must incorporate a flexible data warehousing infrastructure as the foundation for their business analytics investment, so that users can access the information they need when they need it without worrying about delays, rigid infrastructure or system disruption during an upgrade, improvement or disaster.

To meet these requirements, many organizations are leveraging their existing zEnterprise infrastructure, people and processes to support expanding analytic needs. Business-critical analytic applications are complex and involve a broad mix of high-speed transactions and complex queries that must be processed simultaneously with very low latency. Organizations with zEnterprise have the distinct advantage of a hybrid solution that brings together high-volume business transactions, batch reporting and complex analytic queries running concurrently in a mixed-workload environment.

This single-platform, integrated approach to delivering business-critical analytics lets organizations bring analytics closer to the transactional source data—which helps reduce latency, complexity and costs while improving data quality and governance. The zEnterprise analytics solution enables organizations to start with their most critical analytics issues, realize immediate business value, and then position the business analytics strategy to meet and exceed business and market demands. The following sections explore the capabilities and solutions that differentiate zEnterprise as an analytics platform.

IBM zEnterprise: The data source for analytics

A significant number of data transactions in banking, insurance, retail, telecommunications, utilities and government—from financial transactions to customer lists, personnel records to manufacturing reports—occur on the mainframe, including:

- 97 of the top 100 worldwide banks[2]
- 21 of the top 25 insurance organizations[3]

IBM zEnterprise is the platform of choice for these industries because of its unparalleled quality of service and performance.

Providing timely, accurate and secure access to business-critical analytics

To realize the full potential of analytics, organizations must ensure timely, accurate and secure access to all business information. They need analytics solutions that can help them:

- Gain faster access to the source data as it is created to support operational decision making on the front lines of the business
- Ensure that the information used to make critical business decisions is consistent, reliable and accurate
- Make sure that their most critical asset, their corporate data, is protected, secured and governed as it is proliferated across the organization for use in analytics

Compared with traditional analytics approaches, zEnterprise can better help organizations meet and exceed business-critical analytics objectives in these mission-critical areas.

Timeliness

Moving data between platforms increases data latency and impedes real-time delivery of data to users. When source data is moved off of its initial platform for use by analytics applications, it can become quickly outdated because transfers typically happen during nonbusiness hours to avoid impacting transactional system performance. Add to this an infrastructure without the computing power to process expanding volumes of data, and soon it cannot deliver the fast query response times required by data-driven analytics applications. In today's global economy, any delay in accessing data for analytics is unacceptable.

To minimize data latency, zEnterprise decreases the need to move data across platforms by keeping analytic components closer to the transactional data sources on zEnterprise. The data warehouse and transactional data systems can be accessed with a single connection, or between layers if they are in separate subsystems. This reduces the path length and time from data to analysis by using internal memory speed that is not dependent on a physical network—which supports drastic reductions in load and unload times.

In addition, the zEnterprise analytics solution accelerates IBM DB2® for z/OS® queries with in-memory processing, massively parallel architecture, row and columnar store technologies, highly compressed data and compressed data operations. Technologies such as the DB2 Analytics Accelerator for z/OS enable near real-time analytic reporting with minimal latency and superior quality of service—increasing query responses up to 2,000 times.[4] IBM SPSS® Modeler brings real-time scoring to transactional systems, minimizing the need for service calls across platforms with the ability to score 3,000 to 5,000 DB2 for z/OS transactions in real time.[5]

Altogether, these capabilities allow zEnterprise to deliver faster response times for business-critical queries, enabling highly competitive business insight and improved business performance.

"IBM provides us with tools that align with smarter commerce, enabling us to deliver the right message to the right person at the right time, to understand product affinities and intelligently drive the sale, all in a customer-centric way."

—Pavel Batista, Chief Information Officer, Petrol d.d.

Accuracy

Spreading analytic components across multiple platforms when preparing it for analysis degrades data quality. The degradation is compounded when multiple copies of the data are being created to support development, test and production environments. Allowing departments to build and manage business analytics tools based on different business rules further exacerbates the issue. The more the information is handled and transferred, the greater the risk of decisions and analytics being based on outdated or corrupt data. This also corrodes end-users' trust in their information, impacting confidence levels.

Collocating transactional data, data warehouses and analytic tools on zEnterprise minimizes data movement and duplication (and the potential for inconsistencies). The platform scales easily to create a single copy of data that can be accessed by multiple users and groups. It supports consistent business rules by enabling a single analytics tool to be used across the entire organization.

Social data is also being incorporated into analytic applications, providing an even broader view of data for improved insight. Analytic solutions on zEnterprise can aid the analysis of Apache Hadoop data by importing any "golden nuggets" (or key data) from Hadoop into DB2 for z/OS for further analysis across all of the data, including the transactional data already on the zEnterprise platform.

With more accurate, consistent data—and reliable, scalable access to that data—knowledge workers can rely on similar interpretations of enterprise information, fostering a high level of confidence in the data and the trust needed to make critical business decisions in any situation.

Security and governance

When each department independently defines its own levels of data security and governance, regulatory compliance isn't the only requirement that suffers. Moving data down to the departmental level increases the chance of exposing private or secure data, and it is difficult to track who is accessing what data, and why.

Along with minimizing exposure risk by reducing data movement, zEnterprise imposes high-level (Evaluation Assurance Level [EAL] 5) data governance and security consistently across the enterprise. Data is protected with cryptography, encryption and authentication at all levels. User access is defined down to the cell level, and built-in security and trace features enable end-to-end auditing. zEnterprise also facilitates central control while maintaining user autonomy, and supports the application of consistent administrative authorities without allowing data access.

"By keeping data on the mainframe—which offers the highest levels of security—we can achieve our analytical objectives without compromising on security. As we begin the next stage of our big data project, we plan to continue our work with IBM to further enhance our analytics capabilities."

—IT Governance Director, Banca Carige

Analytics on zEnterprise delivers significant value to the business

- Timely information, giving the business what it needs, when it needs it
- Accurate information for all users to make competitive business decisions
- The highest levels of data security and compliance

Delivering the availability, scalability and performance that the business demands

Business-critical analytics applications require an infrastructure designed with the same levels of availability, scalability and performance as the transactional source systems. It is imperative that organizations support an analytics solution that can:

- Ensure uninterrupted access to business-critical analytics 24x7
- Provide a cost-effective disaster recovery (DR) plan where required
- Support larger populations of analytics and growing data volumes
- Deliver consistent performance even as data and user demands fluctuate

The zEnterprise solution addresses these elements through a combination of capabilities that support the rigors of an always-on business world.

Availability

Consistent access to business-critical analytic information is becoming a necessity, much in the way you expect to hear a dial tone when picking up a telephone. Analytics solutions that are unavailable—whether due to scheduled maintenance or an unforeseen failure—are useless to business leaders. In a global business world, there is very little time that can be considered "off-hours" for system maintenance. And with data (and the analytics applied to it) now recognized as a precious corporate resource, disaster recovery and backup systems are vital to retaining not just the data itself, but also access to the data and the ability to use it to continue business transactions.

Building a high-availability infrastructure requires that all potential points of failure are made redundant. This ensures that no single device or software failure can cause the solution to become defective. In a distributed environment, this requires a duplicate implementation of every component, hardware and software, for every function. This approach can greatly increase overall cost and complexity and in many situations make it impossible to meet availability requirements due to lack of budget and resources.

Maintaining data and application availability is an area where zEnterprise excels, and one that lends itself well to analytic applications. The platform supports automated failure detection with built-in hardware and OS recovery capabilities that can either fix an issue or notify and alert staff in advance. By operating in a nondisruptive mode, it enables consistent access to analytics information, even during expansion or systems management activities. The parallel execution and comparisons of instructions identifies any issues, helps uncover their root cause and then fixes the issue to help ensure the task is completed quickly with the highest levels of availability.

zEnterprise also supports DB2 for z/OS data sharing technology and an integrated, cost-effective DR environment. DB2 for z/OS data sharing spreads the data over a wider array of disk space and provides multiple paths to the data to help ensure that it is always accessible. The DR system can be integrated into the network to perform secondary activities when not in use—a strong ROI benefit. And during an outage, the DR system automatically assumes the workload to maintain accessibility and business operations while automatically mirroring any changes made to the master.

"Queries that used to take five hours to complete are now processed in just 20 seconds in the optimized mainframe environment—and we can run them any time, day or night, with no interruption to our production systems on the mainframe."

—Thomas Baumann, IT Performance Architect, Swiss Mobiliar

Scalability

A highly scalable infrastructure is a must-have in today's fast-changing business world, where growth is crucial to success. But as departmental analytic requirements increase, supporting that infrastructure becomes prohibitively costly and complex.

Accommodating growth requires a clear articulation of what resources are currently available and acquiring, along with installing and managing, the new hardware needed to meet the growing needs. Budget and resource limitations that delay or postpone infrastructure upgrades and growth hinder an organization's ability to support more users, more customers and more data—causing users' growth ambitions to fade while they become increasingly frustrated with performance and function.

zEnterprise scales to handle rapid user growth and support large volumes of data without delay because it can add incremental capacity without redistributing data, changing the underlying database or requiring downtime. With the help of automation features, existing staff can handle the ongoing management and growth of analytics solutions through virtualization technology—further enhancing scalability. Additional resources can be preinstalled and prepared, and then activated as needed with a "pay-when-used" plan.

"We had a situation where there were a few different Cognos systems that were being used by different departments—some running on small Wintel servers, or even on desktop PCs, and others on UNIX servers. But we had big ambitions for Cognos to become a true enterprise system, which meant we needed a much more powerful and scalable infrastructure. Moving to Linux on System z was the perfect option."

—Rosario Fiallos, Enterprise Business Intelligence Architect, Miami Dade County

High performance

In today's high-speed world, the business expects applications to respond to user requests in the blink of an eye. However, analytics infrastructures are often overloaded and do not have the processing power to support the large volume of users or the large, complex queries required without significant delays. Reserving capacity for demand spikes leaves important resources idle instead of working to speed everyday business requirements, further increasing the cost of meeting service-level agreements (SLAs). The resulting poor performance frustrates employees and negatively affects user satisfaction, solution adoption and ROI. Unfortunately, improving performance usually requires additional money (new hardware, upgrades to old hardware, faster network components) or staff members' equally valuable time (tuning servers and optimizing their components, upgrading the network).

zEnterprise combines intelligent prioritization and resource allocation capabilities to help organizations enhance the quality of service and the throughput performance of business-critical analytics applications. It prioritizes analytics processes and user requests with automated workload management, allocating resources based on defined priorities to reduce the impact of bottlenecks.

With the ability to perform at 100 percent capacity, the zEnterprise platform can accommodate demand surges and on-demand capacity for testing and development environments without affecting performance. IT staff can also add additional processors, disks and memory dynamically, without downtime, enabling them to deliver a high-quality, pretested analytics solution to business users.

Analytics on zEnterprise delivers significant value to the business

- Consistent solution availability of 99.999 percent to confidently deliver on SLAs
- Scalability to quickly support more users, more functionality and more data
- High, reliable performance to meet and exceed the expectations of the business

Gaining faster time-to-value through rapid deployment and expansion

Once they decide on the optimal analytics approach, IT groups need to rapidly deploy that solution and be ready to expand and adapt it based on changing business needs. Time-intensive

reengineering must be minimized to accelerate deployment times and improve time-to-value. IT organizations need an analytics approach that can be:

- Implemented and expanded without time-consuming hardware and software acquisitions and installations, network configurations, testing, training and supplementary administration
- Centralized so administration staff can collect business requirements and implement them effectively

The zEnterprise analytic solution meets those requirements, allowing for a staged implementation that delivers immediate business value. With proven virtualization capabilities, you can reconfigure and adjust the solution to meet changing business needs without disruptive cable reinstallation or server software and hardware redeployment. You can accommodate all departmental requirements on a single, centralized infrastructure and easily add additional processors, disk and memory dynamically to your existing zEnterprise—all without adding new staff.

The zEnterprise servers can run at 100 percent capacity or higher with the reallocation of resources when they are not in use, optimizing performance and reducing how often expansion is required. Industry-leading virtualization capabilities can be brought online in a matter of minutes (or less) to accommodate more users, more data or both with all processors being used at full capacity.

Capacity can also be increased incrementally without redistributing data, changing the underlying data or bringing the solution down. Plus, on-demand capacity for test and development environments eliminates the need to build and maintain dedicated resources for these purposes.

*"In just four years, Blue Insight has consoli-
dated over 100 analytic environments into
one, has grown to support over 500 applica-
tions, with over 450,000 global users,
drawing information from over 660 sources.
Producing over USD5 million in efficiency
saving and delivering over USD300 million
in business value from sales channel and
supply chain optimization to early defect
detection for hardware and services, to
name just a few."*

— James Correa, Senior Manager, IBM Business Analytics Competency
   Center (BACC)

To help organizations further speed up time-to-value,
IBM offers a breadth of deployment options on the zEnterprise
platform, including IBM zEnterprise Analytics System 9700 and
9710. With these analytic offerings, organizations can quickly
acquire and deploy a cost-competitive analytics solution com-
prised of fully integrated hardware, software and services.

The systems provide an adaptable foundation that makes it easy
for organizations to rapidly expand their analytic strategies
without the need to continually re-architect. All components
have been preselected, pretested and integrated into a cost-
competitive solution, including data warehousing; data
movement, cleansing and management; BI; and predictive
analytics tooling.

Figure 1. IBM zEnterprise Analytics System 9700 delivers cost-competitive,
integrated business-critical analytics.

Analytics on zEnterprise delivers significant value to the business

- Ability to start with your most critical business requirement and expand quickly
- Best practices applied to new deployments for faster time-to-value
- Abbreviated learning curves and enhanced user efficiency and satisfaction
- Little to no disruption when expanding the solution and on-boarding new users

Reducing the cost and complexity of supporting analytics across the enterprise

IT groups are tasked with supporting an enterprise-wide analytics solution while also lowering costs and reducing data center complexity. For that reason, they need to consider all platform alternatives and decide which platform or combinations of platforms will help them minimize back-end expenses without compromising analytic performance and end-user satisfaction. They need to be able to:

- Identify ways to minimize hard costs while meeting analytic needs across the enterprise
- Cost effectively deliver high-performing, scalable and available business-critical analytics
- Gain greater economies of scale by reducing the time, resources and complexity of analytic deployments

zEnterprise excels in addressing these requirements through the many distinct capabilities already discussed in this paper, including the ability to:

- Add additional processors, disk and memory dynamically without taking the system down
- Use IBM z/VM® to allocate logical Linux servers, physical processor resources or virtual guests dynamically, as needed and on demand
- Run at 100 percent of its server capacity for test and development environments, eliminating the need for dedicated resources
- Reduce data movement by keeping analytics in the same environment as the source data and by using hyper-sockets to process the data between the IBM z/OS operating system and Linux on zEnterprise

Through these and other zEnterprise capabilities, organizations can significantly reduce the number of processors and servers required for analytic deployments, thereby reducing requirements for floor space and power. System administration costs are also drastically reduced with fewer servers and processors to manage. In addition, leveraging the scalability capabilities of zEnterprise minimizes the number of required CPUs and servers, helping to cut hard costs as well as associated space, heating and cooling costs.

"IBM DB2 Analytics Accelerator enables us to grow our business while deferring investment in additional compute resources. Looking to the future, we're keen to use our optimized solution to augment our risk and fraud calculations—which could help us to deliver even lower premiums, win new customers and accelerate our business growth."

—Thomas Baumann, IT Performance Architect, Swiss Mobiliar

Meeting today's requirements for business-critical analytics

The zEnterprise platform is well matched to today's require-ments for business-critical analytics. As companies hosting source data on zEnterprise already recognize, zEnterprise is one of the most secure, highly available and reliable platforms on the market. It can scale to accommodate increasing volumes of data and a growing number of users while also simplifying the deployment, maintenance and management of analytics solutions.

By combining zEnterprise with industry-leading IBM technolo-gies such as DB2 for z/OS, IBM DB2 Analytics Accelerator, IBM Cognos® Business Intelligence, IBM SPSS Predictive Analytics and zEnterprise Analytics System 9700 and 9710,

organizations can integrate high-volume business transactions, batch reporting and complex analytic queries and run them concurrently in a mixed-workload environment to:

- Leverage existing zEnterprise infrastructure, people and processes to deploy and support expanding analytic needs
- Minimize data latency, complexity and cost by bringing data transformation and analytic processes to where the data originates
- Make operational data accessible to more users in a timely manner without impacting core business processes
- Enable near real-time operational analytics with minimal latency and superior qualities of service (reliability, availability and serviceability)

The zEnterprise platform provides a truly modern, cost-competitive analytics infrastructure that is primed for big data initiatives.

With zEnterprise, organizations can apply the same qualities of service to their business-critical analytics as they do to their transactional systems. They can start with their most pressing analytics issues, quickly realize immediate business value and then position their analytics strategy to grow and evolve along with business and market demands—all without the need to re-architect. For organizations with source data that originates or resides on zEnterprise, these advantages exemplify significant value.

For more information

To learn more about analytics on IBM zEnterprise, please contact your IBM representative or IBM Business Partner, or visit:
ibm.com/software/os/systemz/badw

[1] "Outperforming in a data-rich, hyper-connected world." IBM Center for Applied Insights study conducted in cooperation with the Economist Intelligence Unit and the IBM Institute of Business Value. 2012.

[2] Based on "The Banker," System z install base and financial records.

[3] Based on IBM market development and insights documentation on top 10 insurance companies, ranked by non-banking assets.

[4] Based on actual deployments in production by IBM customers.

[5] IBM internal performance testing.