



## WHITE PAPER

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### HP: Delivering Value in Business Intelligence

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### IN THIS WHITE PAPER

As organizations seek to incorporate intelligence into business operations, a robust infrastructure is necessary to meet mission-critical requirements for high scalability, availability, and performance. This paper describes HP's solutions for business intelligence, which are built to address these mission-critical requirements.

### SITUATION OVERVIEW

According to a recent IDC survey of IT and business executives, over 55% indicated that they are investing in business intelligence in 2005 (*3Q04 IT Decision Monitor: Vertical Markets' IT Solution Investment Areas and Priorities*, IDC #31778, August 2004). It is clear that despite major investments in enterprise resource planning (ERP) and customer relationship management (CRM) over the last decade, businesses struggle to gain competitive advantage by leveraging the information captured by these systems.

The goal is more than enabling access to information. Businesses must support the analysis and application of information in order to make better operational decisions. What should be recommended to a specific customer? When should seasonal merchandise be marked down? Implementing smarter business processes is where business intelligence impacts the bottom line and returns value to an organization.

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### Measuring Business Intelligence Benefits

To make the case for value, IDC has found that organizations who successfully integrate business intelligence into a business process can achieve a significant return on investment. IDC's *Financial Impact of Business Analytics* study interviewed over 40 companies in a wide variety of industries in North America and Europe. The study found that a business intelligence implementation generates a median five-year return on investment (ROI) of 112% with a mean payback of 1.6 years on average costs of \$4.5 million. Of the organizations included in this study, 54% had an ROI of 101% or more. The largest class of benefit was due to "business process enhancement," where BI was applied to operational decisions in areas such as logistics, call centers, fraud detection, and marketing campaign management.



Yet these benefits do not come without effort. From an organizational perspective, the business units affected by the business intelligence project must be intimately involved and committed to the project. Likewise, management must have an in-depth understanding of its business processes and a clearly defined set of goals to be achieved. And finally, the technology platform for business intelligence must be capable of delivering information on demand, at the point of an operational decision, in a cost-effective manner.

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## Requirements for Mission-Critical BI

Applying business intelligence to an operational process can provide a significant return on investment. In this environment, a transaction processing system and a business intelligence application form a *closed loop*. Transactional data is analyzed by a business intelligence system. For this analysis to be valuable to the business, *actionable information* must be developed that can be directly applied to business operations that lead to new transactions, and the cycle continues.

But if business intelligence is to be a strategic part of operations, then BI systems must be as available and scalable as any mission-critical system. Future developments will tend to accelerate this move to common requirements, an important consideration for buyers looking to ensure long-term protection for today's investments. IDC research shows that this future state is becoming a reality for many companies.

- ☒ **The Scalability Challenge.** The 2004 *DM Review* readership survey (in which IDC participated as a contributor and editor of questions) indicated that data warehouses in support of business intelligence that are "large will get larger." Fully 78% of companies whose data warehouses were larger than 500GB expect them to grow at least 25% in the next three years, 41% of these organizations expect the data warehouses to grow at least 50%, and 27% expect their data warehouse to at least *double* over the same time period. Beyond the internal requirement for better decision making, data volumes are also growing due to compliance initiatives that require not only storing more data but having the ability to retrieve it on demand.
  
- ☒ **The Availability Challenge.** Growth in end-user populations has also increased the demands placed on business intelligence systems. Market research from the *DM Review* survey showed that 34% of organizations with \$500M+ in revenue have over 1,000 total users and that 33% of organizations of the same size have at least 500 concurrent users. No longer are just a few high-level executives or select analysts provided with a dedicated executive information system (EIS). Modern business intelligence solutions reach a broad population of managers, analysts, and staff as well as external stakeholders such as suppliers, partners, customers, legislators, and others. Of the large companies surveyed, 45% already provide reports to external stakeholders. With BI users distributed across multiple time zones and counting on information access in the course of daily operations, availability requirements approach 24 x 7, just like any mission-critical system.

☒ **The Security Challenge.** One of the main goals of BI solutions is to deliver the right information to the right people at the right time. As the number of end users both inside and outside the organization increases, a premium is placed on user rights management. On the one hand, each constituent group requires its own view of the information. On the other hand, each group is limited in what information it is allowed to view.

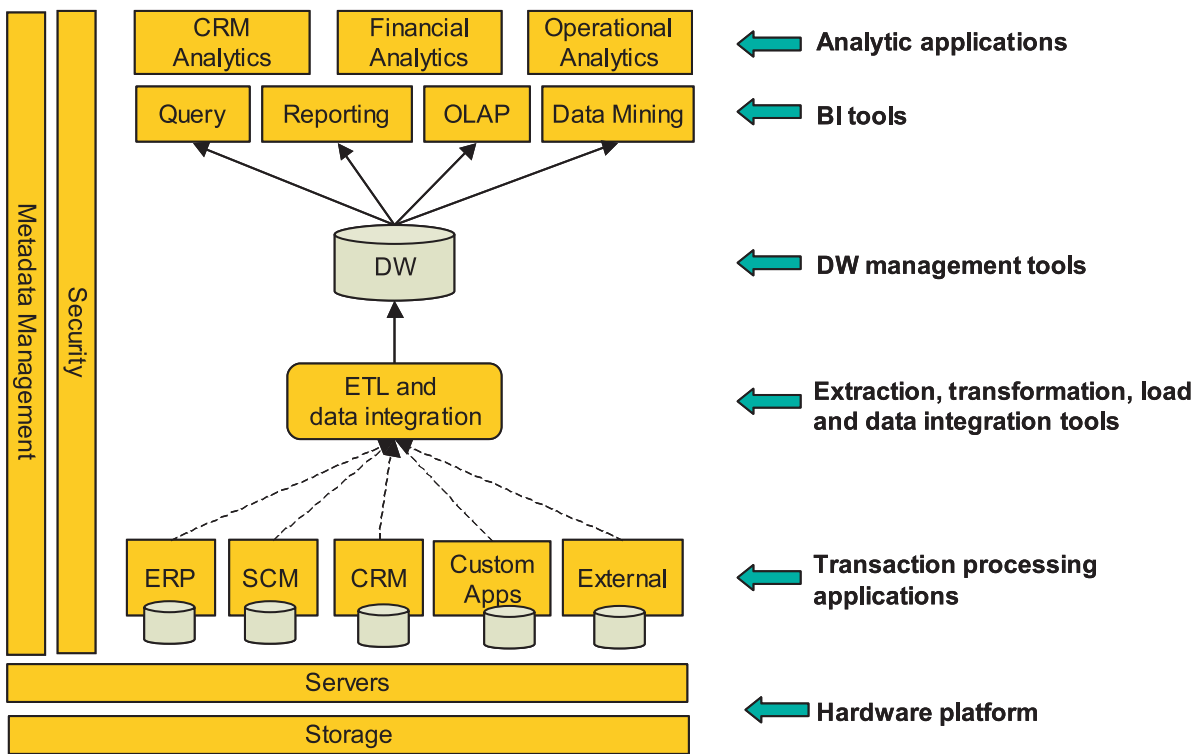
Mission-critical BI depends on a secure, reliable, cost-effective, and high-performance infrastructure. HP's BI solutions (integrated hardware, storage, management, partnerships, and services) are built to meet these demanding requirements.

## HP's Business Intelligence Solutions

A complete, mission-critical BI technology stack includes not only the BI, data warehouse management, and data integration software, but also a robust hardware foundation that can support scalability both from the data and user perspectives (see Figure 1 for a simplified reference architecture). Whether executing queries that must return millions of rows of data or supporting thousands of concurrent users, today's BI solutions include technologies provided by multiple IT vendors.

**FIGURE 1**

Reference BI Solution Architecture



Source: IDC, 2005

Because of the interdependencies created by multiple IT products, the solution is only as strong as the weakest link in the technology stack. In other words, if the BI software can't take advantage of the scalability of the IT infrastructure, the performance of the stack is limited. If the solution does not support a robust security model, it can't be utilized to deliver information to all the internal and external constituents. If the servers or storage can't scale, the best data warehouse software will not provide the just-in-time decision support needed by the organization.

HP's BI solution provides prebuilt integration with other parts of the technology stack, including data integration, data warehouse management, BI tools, and analytic applications. HP provides its DW infrastructure solutions on its own, but also creates solution bundles with its major partners. These solution bundles include preconfigured server and storage hardware and systems management software with the application, database, data integration, and business intelligence software of its partners.

To create these bundles HP has invested extensively in performance optimization and testing at its numerous competency centers. These preconfigured bundles help organizations achieve a jump-start on their business intelligence implementations by eliminating certain up-front integration and deployment steps.

### ***HP and Data Integration***

For solutions dedicated to extracting, transforming, and loading data from transaction processing systems to the data warehouse or data marts, HP partners with leading extract transform & load (ETL) and data integration vendors, such as Business Objects, SAS, Ascential and Informatica.

### ***HP and Data Warehouse Management***

HP provides solution bundles with several leading database management providers:

- ☒ **Oracle.** HP codeveloped Oracle RAC (Real Application Clusters) and possesses a cooperative technology support agreement that provides the customer with a single point of contact for issue resolution. HP and Oracle have tested their joint offering through multiple leadership TPC-H benchmarks on both HP-UX and Linux operating systems. They also maintain technology centers staffed with both Oracle and HP personnel.
- ☒ **Microsoft.** HP also has competency centers dedicated to Microsoft SQL Server. The two partners have conducted several TPC-H benchmarks on Integrity and ProLiant platforms, providing customers with proof-points of data warehouse solution scalability.

With these two partners, HP has packaged replicable solution deployment services delivered by HP's Consulting & Integration services practice.

### ***HP and BI Tools and Analytic Applications***

The most visible software (to the end users) in the BI solution stack is the query and analysis, reporting, OLAP, and data mining software from vendors such as Business Objects, Cognos, Hyperion, SAS, and Informatica.

The relationships with these BI vendors range from a reselling and support services agreement with Business Objects to performance optimization with SAS. Other examples of HP's bundled solutions include HP's Revenue Analyzer solution that includes Business Objects dashboard and query and analysis solutions. HP Revenue Analyzer is a revenue assurance solution for telecommunications companies. Another example is HP OpenView SQM (Service Quality Manager), an SLA management solution that includes BusinessObjects WebIntelligence for query and analysis. There are more examples with other pure-play BI vendors as well.

Besides the bundled solutions with the pure play BI vendors, HP has technology and services partnerships with applications vendors. One of the most widely deployed of these bundles is a combined HP and SAP solution. HP's partnership with SAP in the data warehousing and BI markets extends from large enterprises to the small and medium-sized businesses (SMBs). Solutions include HP's hardware and systems management software and SAP's enterprise applications and BI tools such as SAP NetWeaver and SAP BW (Business Information Warehouse). Today, close to 3,000 SAP BW deployments run on HP infrastructure.

HP has also developed solution centers with Siebel for proof of concept testing and solution validation, solution integration, and optimization.

### ***HP and Systems Integrators***

HP does not limit its partnerships in the business analytics market to software providers. HP has collaborative services offerings with such industry-leading systems integrators (SI) as CapGemini, BearingPoint, Accenture, Deloitte, and others. These offerings range from capturing business requirements based on tactical business analysis and long-term needs assessment to developing detailed business process and data flow and ETL routine designs.

Some examples of the types of joint services provided include:

- ☒ A partnership with CapGemini for Business Objects, Oracle, and SAP NetWeaver implementations
- ☒ Joint scalability testing and tuning for Siebel and its analytics offerings
- ☒ Joint development effort with BearingPoint culminating in a BI reference architecture; HP and BearingPoint also partnered on deployment of ROI Assessment services and joint solutions with Oracle Consulting to migrate customers to Oracle's Linux-based RAC solution as well as with Business Objects for Enterprise Performance Management solutions

In addition, HP's Consulting & Integration (HPC&I) services group has built hundreds of data warehouse and data mart solutions for customers. HPC&I's own services include total cost of ownership assessments during the initial planning stages of a project, detailed architecture design, systems and storage configuration, testing, and management, as well as support services for business continuity processes.

### ***BI Solution Bundles Fulfill a Real Market Need***

HP's relationships with software firms and systems integrators allow each to contribute their respective core competency and value to the solution. By focusing on the infrastructure components, HP is able to work closely with software vendors without creating conflicts of interest in the sales, implementation, and customer service processes.

Preconfiguring and pretesting solutions enable HP and its partners to offer standard products for standardized needs — a proposition valued by organizations that are not looking to reinvent the wheel when it comes to BI solutions. A recent IDC and *InfoWorld* survey of over 500 organizations found that "prepackaged integration modules for various applications" and "increased adoption of standards within products" were among the requests most frequently made of IT vendors.

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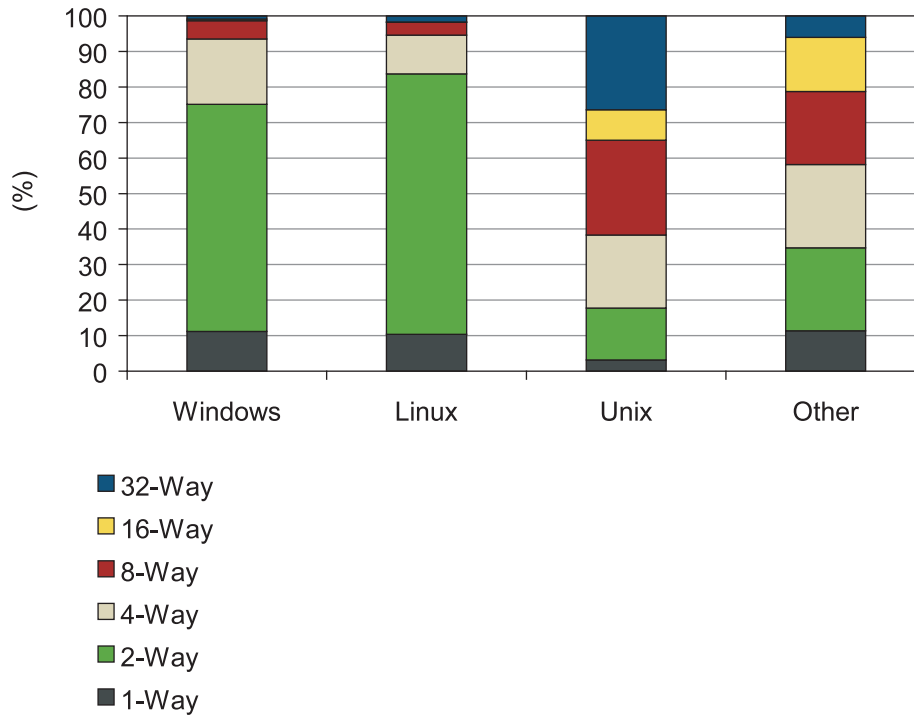
### **BI Solutions for a Variety of Server Platforms**

Given the wide variety of business intelligence workloads that customers support within their enterprises, server vendors must supply a spectrum of server platforms that can host multiple operating systems, software stacks, and BI applications. As a result, server vendors must build a foundation for flexible computing—and many of them are leveraging widely adopted technologies in place of proprietary technologies to address these needs. This use of industry-standard components allows cost-effective business intelligence solutions to be brought to market, reducing a customer's total cost of acquisition and total cost of ownership.

At HP, the Industry Standard Server (ISS) group, the NonStop Enterprise Division (NED), and the Business Critical Server (BCS) group have charters to support a wide range of workloads, including BI. Offerings from each group combine to form a computing spectrum of servers that range from single-processor towers and blade servers to fault-tolerant real-time systems to scalable Superdome servers supporting multiple workloads in multiple partitions, reflecting the need to have systems that span the needs of HP's customer base. As Figure 2 demonstrates, a variety of operating systems are utilized to support BI solutions. Furthermore, this chart provides evidence that the scalability of the underlying server infrastructure varies significantly based on the nature of the BI workload, as well as the experiences of the customer.

**FIGURE 2**

WW Business Intelligence Server Customer Spending (US\$M)  
by OS and CPU Capacity, 2003



Source: IDC, 2005

During the economic downturn of 2001–2003, many IT managers sought to address complexity via greater standardization, leveraging industry-standard components and widely used software packages, wherever possible. These technology choices fit well with IT managers' plans to simplify and streamline existing infrastructure with standard building-block systems. Additionally, many CIOs are attempting to create an environment that integrates IT investments with specific business objectives. Often, the first steps in making IT systems more responsive to the ever-changing business needs start with standardization of IT infrastructure and with server consolidation.

### ***HP's Customer Choice in Servers***

As it moves forward on its road map, HP has already designed all of its servers with common elements that will ease operations for IT organizations that deploy more than one type of server platform. These common elements include standardized management and monitoring software, storage, services, and operating systems.

Business Intelligence has evolved to the point where historical ERP and CRM data is often leveraged and real-time data is simultaneously accessed from a wide variety of platforms and applications. At the same time, downstream services include portals, data stores, and data marts running on mixed platforms. To meet these evolving needs, HP is providing a broad spectrum of server and storage product offerings to its customers, so that it meets requirements for a wide variety of business intelligence needs within the marketplace.

HP has committed itself to a best in class approach to operating environments, which include Linux, Windows, and HP-UX Unix-based systems. This platform-agnostic approach enables customer choice while enabling performance tuning throughout the product portfolio. Additionally, this strategy enables consistent management, availability, and disaster recovery tools; processes; and services. Accordingly, HP's server line, going forward, will be based on x86, x86-64, Itanium, and RISC processors.

### **ProLiant x86 Servers**

The ProLiant server line uses processors that support both the x86 and x86-64 extension instruction sets — HP's support for x86-64 processors will complement the company's already broad support for 32-bit Xeon x86 processors in the rapidly growing industry-standard server category. Here are some of the reasons why 64-bit extensions will attract new BI workloads to the ProLiant server base:

- ☒ Platforms using x86-64 processors will allow customers to bring forward existing 32-bit applications and to migrate selected BI workloads to 64-bit addressing on a tactical basis. Implementations of the x86-64 instruction set vary slightly, but this architecture is aimed at bridging 32-bit and 64-bit computing architectures.
- ☒ Clustered configurations of x86-64-bit industry-standard servers with large storage subsystems and fast interconnects among server nodes will, in some cases, take on BI and database workloads that are now running on more traditional SMP servers.
- ☒ The operating systems that will play the most prominent roles in the x86-64 space will be Microsoft Windows and Linux — both in 32-bit and 64-bit versions. This choice will allow Linux and Windows workloads to grow with the x86-64 platform itself — taking on more scalable, mission-critical BI workloads over time.

### **Integrity Itanium Servers**

HP Integrity servers using 64-bit Intel Itanium processors will support mission-critical operating systems, including HP-UX 11i, Windows, and Linux and are designed for higher performance and scalability than ProLiant systems. These platforms support the two primary data warehousing databases that HP partners with — Microsoft SQL Server and Oracle. Additionally, they are also primary platforms for SAP. HP's Integrity servers will support mission-critical business intelligence at prices driven by volume economics. Here are some of the reasons why Itanium-based Integrity servers are optimally suited to new and expanding BI workloads:

- ☒ As a result of the large data sets, availability requirements, and scalability needs associated with business intelligence workloads, Itanium-based Integrity systems are well suited for BI processing demands.
- ☒ HP's mission-critical OS (HP-UX) will be supported by HP's Itanium-based Integrity servers. In addition, both Microsoft Windows and Linux distributions, running in 64-bit mode, will gain increasing importance in the scalable server space — running within partitions on the most scalable Itanium-based servers or in single-system image on a range of Itanium-based servers, starting with uniprocessors and scaling up to 128 processors.

## **RISC-Based Servers**

With the launch of its Integrity line of servers, HP has initiated its road map by delivering Itanium-based servers as successors to all of its RISC-based servers. However, HP continues to offer a full range of HP-9000 servers based on proprietary PA-RISC processors. These systems are configured to run HP-UX and are optimally suited to support the most robust BI workloads.

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## **Tiered Storage Offerings Complete the BI Platform**

In parallel with their server offerings, HP offers a range of storage array solutions. As expected, all products are well-integrated with HP's management software. HP has put significant effort into this integration and considers it a competitive advantage.

For smaller and simpler BI configurations, HP offers the MSA1000 storage family. These provide strong BI (sequential read) performance and throughput when several arrays are run in parallel through SAN switches. HP's EVA and XP storage array platforms deliver much higher throughput and total storage capability. They include a more robust set of management and availability services to reduce administrative effort.

HP's recently announced XP12000 series provides a step increase in storage platform functionality. It provides several features to streamline storage consolidation, a common next step as businesses convert standalone data marts to subsidiary marts surrounding an enterprise warehouse. For instance, the XP12000 can front-end existing MSA storage arrays to simplify management and configuration.

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## **Addressing Availability, Scalability, and Security Requirements**

IDC believes that a fundamental link exists between server platform and workload. Because BI workloads come in all shapes and sizes, the availability, scalability, and security requirements can vary dramatically. As a result, the BI workload profile directly impacts the underlying server platform. These criteria include:

- ☒ **High availability.** Mission-critical workloads, such as business intelligence, require very high availability. HP has long been a leader in high availability through their world class server clustering offerings. Server outages are caused by many different reasons, including hardware component failure, software failure, and human error. Clustering solutions, typically involving two or more servers with shared storage connected together by an interconnect, use clustering software to initiate a fail-over of BI workload from the failed server to an alternative server. HP's clustering technology is often the choice for workloads where 24 x 7 requirements are essential to the ever-expanding BI user base in many organizations.

- ☒ **Scalability.** Because BI workloads are difficult to divide into small executable components, such as email serving and Web-serving, a scalable server is often required. At the same time, DWs are growing at profound rates in many organizations, compounding the scalability challenges often associated with BI. In such cases, when scalability matters, HP's line of Integrity and HP-9000 servers has been specifically designed to take on the most scalable BI workloads. Because many BI workloads are highly dynamic, HP offers a variety of utility pricing programs, such as Pay per Use and Temporary Instant Capacity, to meet the scalability challenges faced by many customers. For BI applications without these scale-up, SMP requirements, HP offers scale-out solutions based on x86 and Integrity servers, which are well suited to these workloads. In an emerging market space, HP has demonstrated the scale-out capability of ProLiant/Linux clusters through leading TPC-H results.
  
- ☒ **Security.** Security has become a top issue for many businesses as government and industry regulations, such as HIPAA, Sarbanes-Oxley, Gramm-Leach-Bliley, and SEC regulations, are forcing many users to meet minimum levels of security for their systems in their databases. Through the use of security applications, organizations can provide security management, access control, authentication, virus protection, encryption, intrusion detection vulnerability assessment, and perimeter defense to their BI applications. In addition, HP offers information portals and business-to-business security management specifically designed to meet the rapidly changing security challenges faced by customers today.

## **OPPORTUNITIES AND CHALLENGES**

HP's BI solutions address a significant and growing IT market opportunity. The value of the market for the infrastructure in support of BI (including data warehousing-related data management, servers, and storage) has surpassed \$16 billion. In addition, the growth of data volumes, and the need for blending data warehousing and business intelligence with ongoing operations call for a robust infrastructure to deliver business intelligence. HP provides solutions that are system agnostic, ranging from Windows to Unix to Linux systems. With HP's strong position as a server and storage platform for major enterprise applications, notably SAP and Siebel, it is in a favorable position to extend its footprint to become the analytical platform in support of these enterprise systems.

HP's challenge is to differentiate its solutions amidst a crowded field. BI solutions are becoming verticalized, and HP has made a good start with a solution for telecommunications, combining an industry-specific data model and prebuilt integration to popular industry sources. It would be advantageous for HP to follow this example in support of other industries. This addresses the major implementation challenge — data integration. Finally, providing innovative business practices that address cost of implementation issues, such as fixed cost implementations, are creative ways to reduce customer risk and gain increased customer mindshare as a true partner for BI implementations.

## **CONCLUSION**

Business intelligence is one of the leading investment priorities for companies today. This reflects greater recognition of the need to reduce complexity caused by multiple sources of information and to improve decision-making processes in the enterprise. Yet companies face implementation challenges, notably data integration, scalability, availability, and security issues. HP has leveraged its long experience in data warehousing to package BI solutions for popular data sources and for a range of server and storage configurations. By addressing the key challenges, HP's solution bundles can reduce project implementation times and hasten the time to realize BI benefits.

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