



# building an adaptive supply chain

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## what does it mean for a company to be adaptive?

For certain, it means dealing effectively with competitive realities. Successful organizations adapt quickly to changes in their environments. They keep up with the globalization of technology. They embrace the “customer economy” and all it implies: shorter time to market; decreased order cycle time; improved predictability; quicker, more reliable decision making; and increased responsiveness.

Being adaptive also means knowing how to reduce infrastructure costs, including transactional, procurement, manufacturing, logistics, and transportation costs. Indeed, the measure of an adaptive enterprise can often be found in its supply chain. If the supply chain isn't proactive, the larger enterprise won't be either. An adaptive supply chain network is an interconnected value chain that allows a company to respond quickly to changes in order to solve problems before they affect the company's business or its customers.

The question is: What is required for an enterprise to transform its existing supply chain into a robust, adaptive supply chain network? Some capabilities are essential.

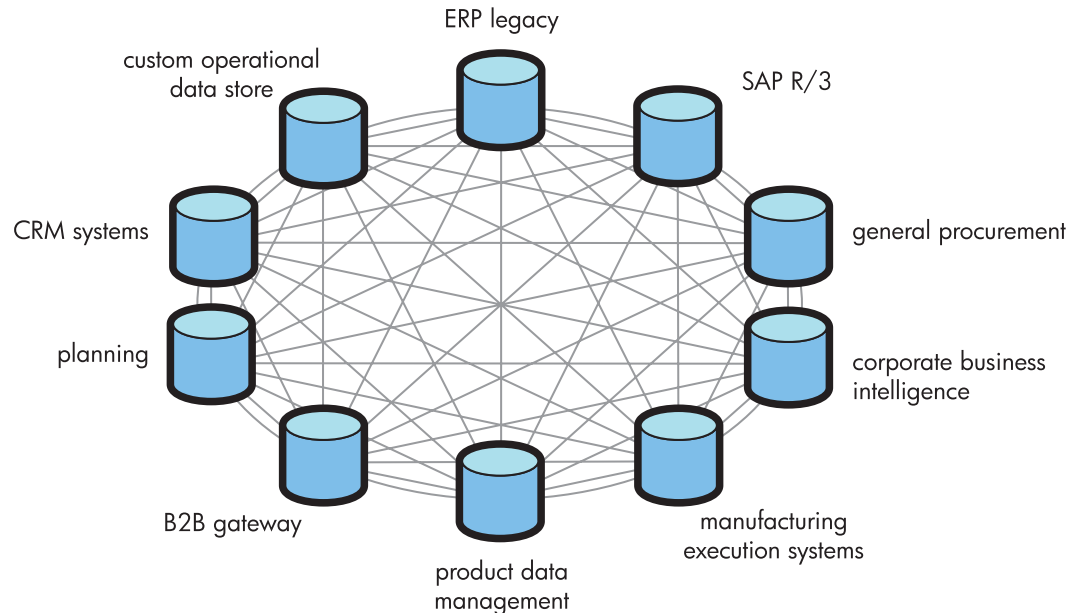
- **Real-time integration**—The sharing of critical business events, as they occur, among people and systems is the vital link to adaptive supply chains. This requires the implementation of an enterprise integration strategy that drives real-time integration across the supply chain portfolios.
- **Supply chain visibility**—The capability to provide a continuously available and updated 360-degree view of critical supply chain processes is another cornerstone of an adaptive supply chain. This allows process owners to improve operations, customer satisfaction, and overall supply chain execution, thereby enabling real-time order management.
- **Event-based exception management**—Once business event information is available in real time across the enterprise, the capability to respond automatically and instantly to changes in that supply chain becomes paramount. This requires the deployment of active event management tools, agents, and business processes across the supply chain to detect exceptions and correct them or to notify someone of the exception.
- **Collaborative processes**—Establishing collaborative partnerships and processes with key members of an enterprise's network helps create adaptive supply chains across the extended nodes of today's networks.
- **Simplified and standardized environment**—The ability to create an environment in which the business processes and IT architecture are flexible and standard is also important. Without such an environment, the complexity of driving visibility and integration across the network becomes insurmountable.

Of all of these capabilities, the most crucial for the adaptive enterprise is *real-time integration*. In fact, according to both Gartner and META Group, real-time integration is the number one IT issue in the world today. It is essential that critical information and transactions be somehow integrated in one place, in real time.

By integrating all applications, transactions, and data, information users gain the benefits of an up-to-the-second view of the business, a single view of their product or customer across different applications, and, most importantly, the ability to react automatically to that information in real time with consistent business rules. They can *see, know, and act now*. In other words, they can be truly adaptive.

## what are the challenges of building an adaptive supply chain?

The most significant challenge is how to integrate disparate business processes (which drive disparate information systems, which drive disparate databases across disparate platforms) (see figure 1).



**figure 1. the challenging supply chain integration landscape**

In academia, the mantra is, “publish or perish.” In the corporate world, it has become “integrate or implode.” The business enterprise of the 21st century must provide a real-time view of the business, delivering a single, comprehensive view of the enterprise across all business applications. From a technology standpoint, that means

- Integrating new technologies while protecting legacy IT investments
- Integrating multiple business applications, versions, and disparate databases
- Integrating ever-increasing amounts of data to accommodate faster transactions rates, while delivering 24 x 7

And all these requirements must be addressed while cutting costs, reducing margins, and increasing profits.

The essential challenge of integration is to address the duplication of hardware, applications, and databases that have become an unwanted reality of contemporary business. In fact, Gartner estimates that over 35 percent of IT budgets worldwide will be spent trying to solve the problem of integration (Gartner Consulting, “An Approach to Building a Business Case for Zero-Latency,” May 2001).

Almost all IT shops face a recurring nightmare: islands of data. To complicate matters, discrete functions inside an enterprise often adopt a “silo” mentality, optimizing their own operations but greatly complicating the overall corporate computing infrastructure. This results in an overabundance of replicated data, massive batch processes, and thousands of point-to-point applications. In such an environment, obtaining accurate, enterprisewide data in a timely manner is virtually impossible.

## what is the scope of the integration challenge for any enterprise?

For any enterprise, the information issues and costs surrounding the integration challenge are far-reaching.

### **inconsistent business processes and practices**

Issues such as disjointed data definitions and no common data dictionary or poor global data quality plague many companies, leading to inefficient and costly decision making and the lack of agreement on standard reports to drive the business.

### **complex systems environment**

Similarly, companies find themselves with highly customized environments that carry a high cost of ownership; stalled information flows due to batch processing (rather than real-time information); and information systems that lack flexibility, extensibility, or plug-and-play simplicity.

### **fragmented information environment with limited reporting capabilities**

The impact on the business user of a fragmented information environment is unpredictable report delivery, custom “extracts” and inaccurate data sourcing, and limited visibility of detailed operational data on a global basis.

In any global enterprise, getting the right data at the right time is crucial to decision making and operational capability. It is imperative that when people have a task to complete (logging order book transactions, checking the status of their shipments or the level of their inventory, and so on), they have instant visibility to data.

For many companies, a massive batch-driven process feeds the complexity of system integration. Thousands of custom interfaces are required to move hundreds of subject areas between systems. The impact on day-to-day operations is significant.

- **Order visibility**—Multiple order management systems often result in duplicate deliveries of products. Without order visibility, integrating order information can be difficult.
- **Order status**—Because real-time order status is not available through self-service channels (for example, the Web), account management teams end up being reactive rather than proactive.
- **Credit management**—Often, order velocity and credit management practices are impaired for lack of consolidated and real-time access to credit status of customers across business units and regions.
- **Available-to-promise (ATP) visibility**—Without consolidated and real-time information, visibility of ATP inventory is impaired, and overall order cycle times are longer than necessary.

Concerns such as these (and many others) affect a company’s ability to flex its product line and solutions, deliver reliable enterprisewide data, and scale to meet an ever-increasing systems integration demand.

## what are the options for addressing this challenge?

In today's IT environments, applications can communicate with each other in several fundamental ways. They may exchange information via batch files; exchange messages asynchronously (store and forward or publish and subscribe); or exchange messages synchronously (request and reply as in a typical OLTP application). Each of these integration mechanisms presents its own unique challenges. Complexity is introduced by the great number of applications that must exchange information to support current and future business models.

### traditional custom point-to-point interfaces

The past approach to application integration involved building point-to-point interfaces. Those custom interfaces sought to define a common message structure for use by the two applications. To make this work, either new code was added to each application, or a specialized bridge or translation application was constructed.

In many cases, legacy applications traded small batch data files to facilitate this interface requirement. While batch processing and file transfer are part of a convenient and cost-effective computing methodology, they also add latency to the efficient delivery of information to the business user (see figure 2). In many cases, especially where the application environment cannot be changed, batch processing will continue to be the standard way of exchanging information between applications. The challenge then becomes one of scheduling, monitoring, and performing the batch processes as effectively as possible.

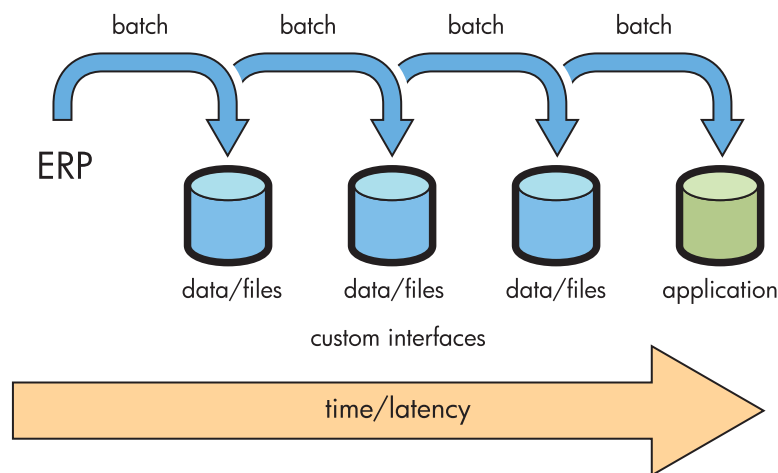


figure 2. traditional custom point-to-point interfaces

### enterprise application integration (EAI)

To support integration of those applications that can exchange information on an event basis, many vendors offer enterprise application integration (EAI) product suites.

The underlying assumption for embracing an EAI strategy is to avoid the reliance on custom point-to-point interfaces. Instead, each application interfaces directly with the EAI application via an adapter application that translates the legacy application message format into a common message format.

“The zero latency initiative is now two years old, and it clearly has been one of the most exciting initiatives to come out of the NonStop Enterprise Division. We have been able to extend zero latency from the original concept of telecommunications to financial industries, utility industries, and retail. Without exception, it has met the objectives and enabled HP customers to extend their competitive capability with an absolutely world-class data store.”

—Peter Blackmore,  
executive vice president,  
HP Enterprise Systems  
Group

This ability to accept messages from one or more applications and deliver the message to one or more applications is the baseline functionality of an EAI application. To supplement this, EAI vendors have adopted an assortment of communications protocols, middleware (for example, Tuxedo, CORBA, IBM WebSphere MQ, and others), data transformation libraries, message routing algorithms, and workflow management application software.

Typically, an EAI vendor is selected based on matching the specific interface requirements with functionality provided by the product suite. Applications may require or prefer that they communicate directly with the database server application or indirectly via an EAI application. Direct communication offers the best performance and lowest latency for information delivery. This is the preferred method when the application is required to provide information quickly, such as in a help desk environment while a customer is on the telephone with a customer service agent.

### **hp seeks a comprehensive application integration platform**

Compaq, now part of HP, recognized years ago that it needed to start to integrate disparate business applications hosted on multiple servers. Different hardware platforms, operating systems, and packaged applications complicated the task of integrating business applications. The company initiated an EAI technology program in which various business events triggered the creation of a message that was then available to other applications.

But questions arose. How should an event be recorded? Does each business application instance record the same event? Does the second business application instance somehow use the information instantly and then discard it? In either case, are provisions made in the legacy application to record the data in case it is needed later? If the event is meaningful to a number of applications, does each application record the information in its own database? Does creating additional data redundancy help to solve the integration problem? If the event is not stored in a central data store as it occurs, will it be possible for another application to request the same information after the fact and have it re-created exactly as it initially existed? On which of the dozens of legacy platforms might the data reside in some form? How would an application know to look there for the information?

It became obvious that both an EAI infrastructure and an operational data store (ODS) were required to build the foundation for a comprehensive integration platform.

The initial breakthrough came with the advent of HP's revolutionary Zero Latency Enterprise (ZLE) architecture, based on the Gartner *zero latency enterprise* concept.

### **zero latency enterprise—a real-time integration environment**

HP's ZLE framework is an extensible architectural approach that integrates data and business processes from across the enterprise in real time to support real-time actions. It incorporates sophisticated EAI messaging middleware and ODS technologies to provide a unified view of enterprisewide, current state, and transaction data.

The data is published by source systems as business events occur. It is received by the ZLE platform, reformatted as necessary, and stored in the ZLE data store. Each source system supplies business events as they occur in near real time. Because the data is transformed, reformatted, and conformed during the load/maintenance process, the ZLE data store provides a rich source of data for new ZLE applications. It feeds the data warehouse or produces case sets for analytics or data mining.

## will hp's ZLE framework serve as the platform of choice for customer IT solutions in the future?

"We see that the ZLE architecture and the techniques that we've employed on the supply chain project could be applied successfully to a variety of other applications and industries. In particular, CRM systems could provide real-time information about customers and their transactions."

—Scott Stallard, senior vice president and general manager, HP Business Critical Systems

By combining data in real time and applying predetermined business rules to analyze it, the ZLE framework delivers data (via push or pull) to applications and people across the enterprise, enabling a central, up-to-the-second view of all parts of the business. With the high-performance HP NonStop server at its core, the ZLE framework scales to meet unpredictable demand and is continuously available.

In fact, HP has developed and deployed replicable ZLE solutions around the world for key vertical industries such as telecommunications, retail, finance, travel, and manufacturing. New in-roads into healthcare, supply chain, and government are under way.

Long term, the HP NonStop server-based ZLE framework will become the core of HP's IT system and the platform of choice for HP's customers to deploy a world of advanced real-time solutions throughout enterprises that demand zero latency applications. The result: new kinds of applications that could not exist without a zero latency environment.

- **Customer-facing, event-driven customer relationship management (CRM)**—including the help desk (with customer service agent access to events that occurred seconds earlier), customer self-service, and electronic bill presentment and payment, all in real time, not time delayed.
- **Web-based customer interaction**—enabling the corporation or the e-store to run its website 24 x 7, make anything that happens on the website available everywhere else in the enterprise, and take instant knowledge out to the customer interface.
- **Wireless-based customer interaction**—delivering assured service and customer content in real time. Immediate automatic notifications pushed out through wireless devices could, for example, deliver real-time notification if a customer exceeds his or her credit limit or if there is a potential problem within the supply chain.
- **Real-time fraud detection**—enabling instant awareness of fraudulent transactions, making it possible to take corrective action on the spot and realize immediate cost savings.
- **Real-time applied data mining**—ensuring asset protection, fraud detection, and dynamic pricing. Today data mining is typically done by taking a batch extract of data, moving it into a data mining system, and analyzing the data over a period of time. Real-time data mining provides the ability to analyze and score customer responses instantly.
- **Operations management**—providing conventional progress management in real time, reacting to events as they occur.
- **Integrated enterprise**—delivering a global, just-in-time business by having the right information in the right place, at the right time, and directing it to the right person anywhere in the enterprise 24 x 7.

## has hp implemented a ZLE solution in-house?

HP believes in its ZLE technology so profoundly that it is leveraging the fundamentals of that architecture in its own adaptive supply chain strategy. This internal initiative is called the *HP NonStop Integration Hub*. The NonStop Integration Hub leverages the ZLE framework to centralize data within key HP supply chain systems and to enable immediate responses to real-time changes in the supply chain.

As shown in figure 3, specialized ZLE applications such as supply chain exception management and supply chain visibility reside on top of the ZLE core to leverage real-time integration. Enterprise applications such as CRM or enterprise resource planning (ERP) are attached to the ZLE framework. Adapters allow an application to call the ZLE core and get a response that can be used as part of its transaction. Meanwhile, enterprise application integration (middleware) allows integration between disparate systems so that HP can avoid writing custom interfaces between applications. And the ZLE data store, acting as a single data store, caches, maintains, and delivers information to the appropriate applications. Thus there is no need to maintain multiple data stores in the enterprise.

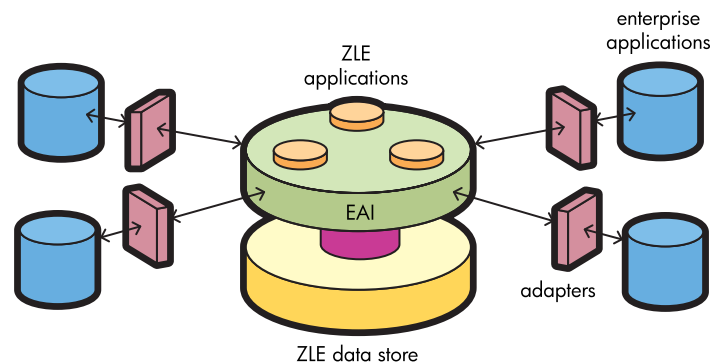


figure 3. deployed hp ZLE-based NonStop integration hub unifying architecture

Because of HP's complex integration environment, the company quickly realized that rolling out software upgrades to the entire enterprise would be a major challenge. But it was equally clear that HP could not continue to rely on traditional point-to-point and batch integration strategies. Those outdated strategies would involve large amounts of custom code and redundant data, and they severely limited system flexibility.

Plus, batch systems equate to outdated data, often 24 hours or more out of date. So, the search began for a better way and ended up with a solution for a next-generation integration hub, the significance of which has everything to do with real time.

## how has the NonStop integration hub initiative evolved?

The first tenet was straightforward: When a business event occurs, it should be pushed out once and only once. The obvious path was to leverage HP's EAI technology. It was also important that all components follow a consistent XML integration messaging strategy and that messages be effectively transformed for other applications and external partners. In addition, a second component was needed—a real-time operational data store—to facilitate integration services and, in the future, event-based visibility.

The development team recognized early that many legacy applications either did not need to subscribe to information in real time or did not have the technology, funding, or manpower to convert to a new infrastructure immediately. Certain applications—for example, executive scorecard applications that are run weekly—are batch-oriented by nature. The system needed the ability to integrate those legacy applications in a batch method to protect the company's current investment. At the same time, the company required an ODS that could integrate disparate applications and enable a single view of the order book across the enterprise.

The resulting solution embodied the classic ZLE architecture: an EAI layer coupled with an HP NonStop server-based ZLE data store. The EAI component, which includes messaging middleware, performs routing and transformation according to preestablished business rules. It also passes messages and data to the ZLE data store, which serves as the centralized source of real-time information for systems and applications across the enterprise. The ZLE data store acts as a subscriber to the EAI layer.

The NonStop Integration Hub has evolved into

- A persistent cache of enterprise data
- The infrastructure to offer event-based (real-time) and batch integration services
- A runtime tool to decouple and integrate HP's data across disparate systems
- The backbone of HP's adaptive supply chain

The NonStop Integration Hub already has compelling proof points to its credit. Numerous subject areas, including sales order status and master data, are currently published in real time across the supply chain. The system provides a unified data integration platform, fed in real time with enterprisewide information for up-to-the-moment visibility. And it establishes an operational data model that will lower the cost of future IT initiatives and accelerate the deployment of new solutions. A mirrored site is planned for a geographically remote location, with HP NonStop Remote Database Facility (RDF) software for business continuity.

Thus, an attempt to solve an essential integration problem ended up producing an architecture for the future—one that enables visibility across the business that amounts to a kind of technological clairvoyance.

## **what is the nature of the technology behind the NonStop integration hub?**

As with so many projects, the technology is the easy part; the data is the challenge. Because HP uses SAP solutions to run its supply chain, one of the primary project goals was to utilize native SAP integration methods between SAP components. The benefit: tight integration between SAP components. By choosing the NonStop platform, the implementation team was able to rely on the system's integrated and highly scalable database management system. And they were looking to interface with either Microsoft®.NET or Java™ technologies, which are supported on the NonStop servers. For real-time technologies, they preferred the W3C standards—particularly XML and XSLT—and followed up with SOAP, WSDL, and UDDI as they brought the Web service connections online. For the batch-oriented side of the transactions, they focused on HP DataLoader/MP software.

The result has been unprecedented mixed-workload support involving

- Hundreds per second, scaling up to hundreds of thousands per second, of random event insertions
- Hundreds to thousands of online TPS (transactions per second)
- Hundreds to thousands of EAI EPS (events per second)
- Complex queries
- Real-time event monitoring

## why the NonStop server architecture?

The decision to put the operational data store on the NonStop server was made early. The team knew that if it was not implemented at the outset, there would probably never be time to build it into the solution in the future. A number of custom databases were already in use, which the team had difficulty scaling, maintaining, and supporting when it came to a mixed workload. Because the NonStop server supports industry standards, it was easy for the implementation team to port existing applications to the NonStop environment.

### availability

Because the NonStop Integration Hub is a mission-critical application—one that subscribes to real-time events across the enterprise—it needs to be available 24 x 7. The project requires a platform for which maintenance time frames do not involve shutting down systems or software. Downtime for a NonStop server is strictly by choice. And it is possible to repartition tables, defragment tables, and update statistics online, all with no downtime.

### scalability

Availability is only part of the story. Also essential is an architecture that can scale easily, given the transaction surge that accompanies real-time data subscription. An environment that can support both real-time event-based loads and complex batch queries is critical. With NonStop servers, it is possible to start with a relatively small system that can grow over time as requirements change. How scalable can that system be? It can range from a two-way processor all the way up to a 4,080-processor system—a scalability that exceeds the maximum needs of any company, for example, the largest ISP in the world.

### mixed-workload support

In business terms, handling mixed workloads means the ability to access live transaction data and warehoused historical data simultaneously from a single database. This allows the enterprise to make instant decisions based on up-to-the-second information.

In technical terms, a mixed workload is characterized by an operational data store that can be updated and queried at the same time while providing a guaranteed service level to other applications. (Service level refers to the ability to guarantee the transaction rate and average response time of chosen applications). This is a differentiating capability of the NonStop server and the NonStop SQL database.

### full-scale business continuity

Simple, flexible tools to support business continuity in a full-scale, integration testing environment are also required. Using NonStop RDF software, both the ongoing production system and the duplicate business continuity system can stay synchronized in real time. When changes occur in the production database, the same change can be made automatically to the remote database.

### reliability

Finally, an absolute requirement is a system designed for reliability. The processors, power supplies, disks, and I/O channels all must have multiple ways to continue working. The goal is to keep the system running, even if a component fails.

The NonStop server architecture (see figure 4) answers all these needs—in a very cost-effective manner—with its possession of the following attributes:

- Basic design principle: no single point of failure
- Message-based operating system

- Collection of 2 to 16 independent processors per node with up to 255 nodes in a network
- Processor communication via multiple HP ServerNet system area networks
- Peripherals and communication lines through dual-port adapters
- Replicated SCSI bus and mirrored disks
- Dual-power systems and battery backup

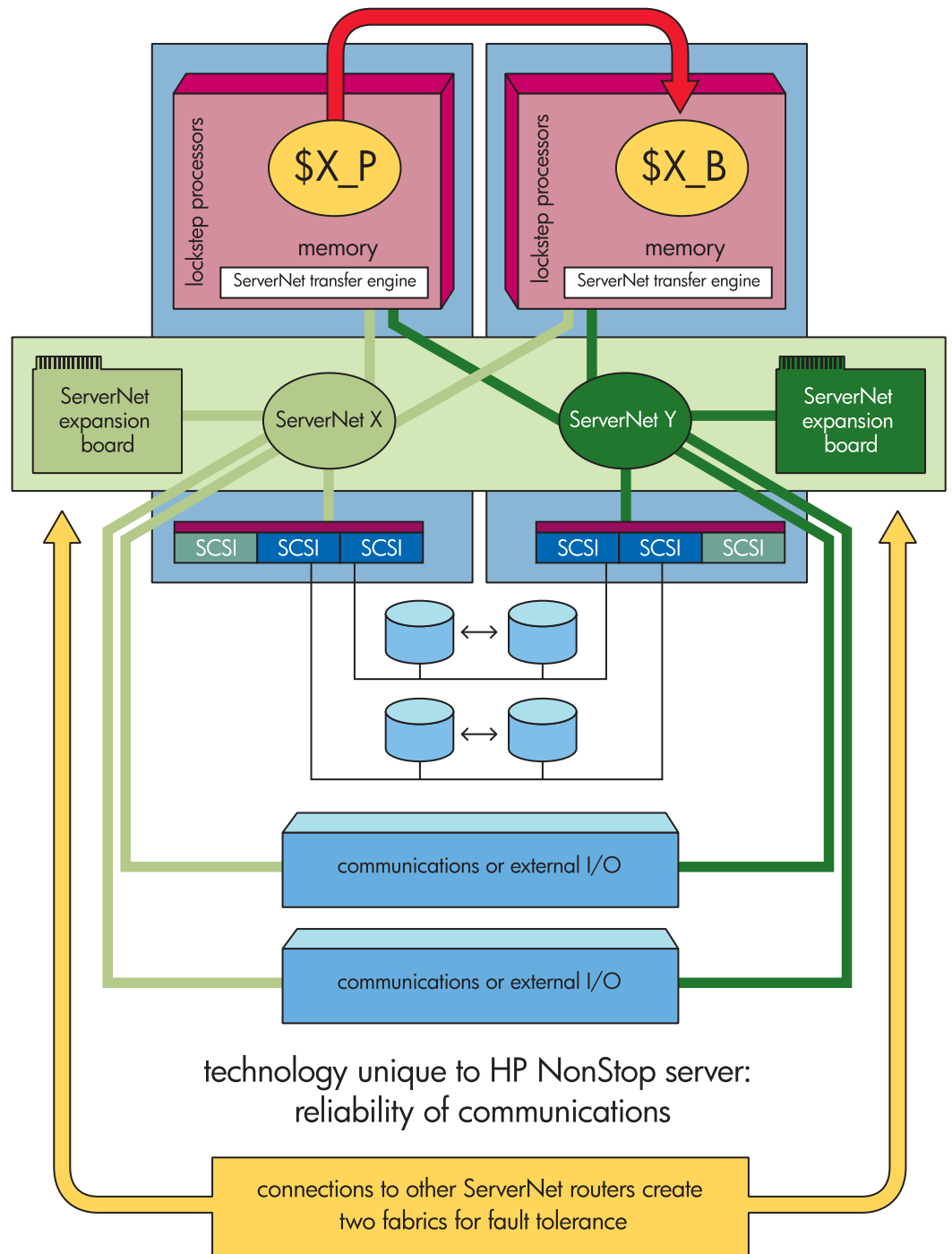


figure 4. hp NonStop server architecture

In addition, the team members found that the NonStop SQL database was easier to manage and required less energy as a result of online table partitioning and real-time synchronization.

**what is the application and data integration model for the NonStop integration hub?**

The objective was to implement a model that would become simply another subscriber to HP's existing real-time infrastructure. The source systems publish business events, which are picked up, transformed, and routed to the NonStop SQL database. All data is converted to the XML format because it is a flexible, self-defining format. HP will certainly follow those standards as they mature.

The HP system uses the DOM-based approach to parsing the XML document, as well as XSLT to transform the XML data into the NonStop Integration Hub's data mode.

One of the real advantages of this system is that HP has developed an essentially reusable product. For example, with other systems, hundreds (or even thousands) of lines of code might need to be written to receive an order document. With this system, no compiled code is required, only a different map for each feed.

**how does the NonStop integration hub technology fit into an existing IT environment?**

The NonStop Integration Hub allows HP to protect its investment in hundreds of business-critical applications currently used within the company's supply chain system. Those solutions can remain in use because of the batch integration services provided by the NonStop Integration Hub. The NonStop Integration Hub enhances, rather than replaces, the existing supply chain systems in which it is being implemented.

When it comes to operations management, the NonStop Integration Hub systems provide for alarm detection escalation of application business issues inside the HP Online Help Desk environment for the entire HP IT infrastructure. The NonStop Integration Hub systems are built to provide 24 x 7 support features, such as problem management, alert notification, ticketing of problems, paging of support personnel, and automatic execution of repair functions under certain alarm conditions.

Using the EMS subsystem, the NonStop Integration Hub passes all of HP's designated alarms, via SNMP traps, to the HP IT network manager, for escalation. HP uses Availability Statistics and Performance (ASAP) software to monitor both development and production entities, such as disks, processors, SQL tables, and other application resources. The system automatically monitors situations, such as disks filling up and invalid programs or invalid usage. It then sends an auto mail message to the database administrator.

**is the NonStop integration hub an "all or nothing" proposition?**

Absolutely not. The NonStop Integration Hub adopted an incremental approach to developing and deploying the new supply chain management (SCM) system.

The challenge was to construct a system of this scale and yet deliver value and return on investment (ROI) from day one. The solution was to prioritize the multiple business entities of most value to SCM customers and to attack implementation with an incremental project methodology, introducing functionality in measurable increments. Thus the data model was constructed in logical pieces, delivering wins around critical business priorities. With this "incremental win" approach, users began to realize tangible benefits quickly.

## incremental win approach

The time and effort to develop a solid integration infrastructure that includes both an EAI framework and a ZLE data store is a sound investment for building a “go forward” architecture. Initially only the baseline architecture need be implemented. The appropriate EAI components can be added later when system requirements and the project plan dictate. Likewise, the ZLE data store can be enhanced over time through the introduction of new tables used to capture additional business events. The beauty of a well-designed architecture is that it will adapt over time to changing needs and new business requirements.

## a model for the adaptive, real-time enterprise

In implementing the ZLE-based NonStop Integration Hub, HP discovered new ways to use real-time information and add value to the enterprise—from ATP to supply chain management and more. When the team began to reevaluate what could actually be done in real time, ROI took on a new meaning. ZLE has become the key to unlocking a new model of doing business.

In July 2002, Deloitte Consulting, functioning as a third-party “trusted advisor,” completed a study illuminating the genesis and development of the NonStop Integration Hub and making the case for its ROI to targeted customers. The Deloitte ROI study will serve as the foundation for a ZLE ROI model moving forward.

The NonStop Integration Hub Initiative is expected to generate significant value with quantifiable ROI on three distinct levels: strategic, operational, and IT (see figure 5).

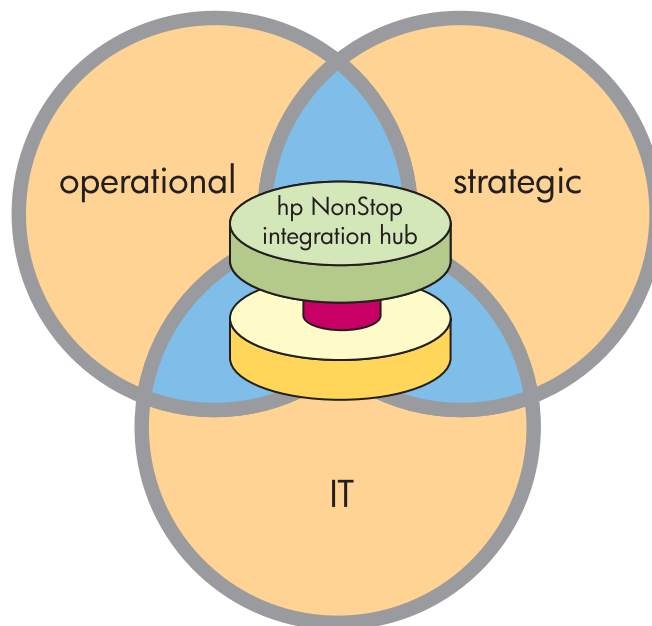


figure 5. strategic, operational, and IT value

### **strategic value**

A key strategic value is the decrease in order cycle time by enhancing real-time visibility of inventory, allowing HP to be more competitive. HP representatives can guide customers to order items that are readily available (that is, in-stock or scheduled), thereby increasing fill rates and velocity.

Other projected strategic benefits of the NonStop Integration Hub are somewhat intangible, but just as significant.

- Improved customer satisfaction, as a result of improved cycle time and delivery reliability
- Competitive positioning among best-in-class supply chains, through continual development of a flexible and adaptive supply chain
- Improved responsiveness and agility, as a result of improved organizational access to critical planning and production data

### **strategic ROI**

The Deloitte study projects that reduced order cycle time and improved inventory velocity can produce a total strategic ROI for HP of over US\$2 million per year. For HP, the primary strategic benefit has been an improvement in order cycle time by 15 percent using ZLE technology.

### **operational value**

The key added value here is visibility of consolidated, real-time supply chain data, which substantially reduces the effort required to find and report orders and improves productivity. Customer service, credit management, and logistics will all benefit. Customer service representatives (CSRs), for example, will no longer have to research order status or customer credit status across several order management systems. Logistics can efficiently schedule labor to ship orders based on real-time information on order status. Not only is productivity improved, but on-time delivery contract compliance and shipping capabilities will be as well. Estimates suggest that productivity gains for CSRs alone will be improved by a factor of 10.

Other projected operational benefits of the NonStop Integration Hub, which are not so easily quantified initially, are

- Improved negotiations of favorable vendor terms, by accessing true volume/spend and consolidated order histories
- Lower materials and freight costs, as a result of determining the exact number of parts required to satisfy open orders in the event of a parts/materials shortage
- Improved customer satisfaction, with exception management alerts that highlight order status issues, past-due orders, and orders on hold

### **operational ROI**

The Deloitte study projects that improved CRM and field support can produce a total operational ROI for HP of over US\$1 million per year. For HP, primary operational benefits fall into three identifiable areas: customer service, logistics, and credit management. Each makes a substantial contribution to enterprisewide efficiencies and profitability.

## **IT value**

The IT payoffs from the NonStop Integration Hub accrue from several areas.

- Eliminating enterprise application dependency on costly point-to-point and batch file integration, obviating the need to build a one-off custom ODS or to develop methods that support application-to-application integration
- Providing a unified data integration platform, with the capability to deliver a single, real-time view of information from across the enterprise
- Delivering architectural scalability and availability for the enterprise, by breaking performance and availability dependencies between systems
- Accelerating solution implementations and reducing integration costs, by enabling integration through standard software integration methods
- Reducing support costs, by eliminating the need for custom development and enabling quicker software upgrade cycles

## **IT ROI**

The Deloitte study projects that reduced development and database management costs can produce a total IT ROI for HP of over US\$6 million per year. In quantifying the future IT ROI, HP projects benefits in several other areas.

- Faster recognition of HP and Compaq merger synergies and cost reductions, as a result of faster systems deployment with a more efficient architecture and technology
- Improved system reliability, owing to the HP NonStop server
- Nominal incremental hardware and software costs in the continual deployment of the NonStop Integration Hub, on account of the highly scalable architecture
- Increased accuracy and consistency of data, because of consolidated data

## **returned net present value**

According to Deloitte, HP's investment in the NonStop Integration Hub will return a net present value (NPV) of US\$37 million over five years.

## **complete investment protection**

The ZLE-based NonStop Integration Hub investment will be fully recovered in the second year if *any* of the following objectives are met:

- Improve order cycle time
- Reduce inventory days
- Avoid building additional large operational data stores
- Avoid developing hundreds of custom interfaces

Anything beyond these benefits will provide an incremental value to the investment.

**the ultimate benefit:  
a state-of-the-art,  
real-time, adaptive  
supply chain**

The NonStop Integration Hub represents HP's investment in the adaptive, real-time enterprise, the model for today and tomorrow. It is a unique, unifying ZLE architecture for integrating, synchronizing, routing, and performing transactions in real time. Disparate data and business processes are brought together across the enterprise to support real-time decision making and actions.

Initially focused on integrating order management and supply chain systems to provide real-time supply chain visibility, the NonStop Integration Hub will demonstrate significant IT, operational, and strategic benefits for HP.

- Elimination of costly duplication of databases for new applications and point-to-point interface development and maintenance
- Consolidation of real-time order status, reducing the manual effort required to consolidate, report, or research order status
- Improvement of order cycle time and inventory velocity by providing real-time visibility to inventory

The bottom line? Increased profits and stronger customer loyalty.



For more information, go to [www.hp.com/go/zle](http://www.hp.com/go/zle).

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