



**IBM Informix Dynamic Server,  
Version 9.4 boosts revenues,  
improves business efficiencies.**

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**Exceeding the performance of IDS 7.31**

For more than 10 years, IBM Informix® Dynamic Server (IDS) has been a favorite database for companies with enterprise-class online transaction processing (OLTP) and online analytical processing (OLAP) systems. Now with Version 9.4, IBM IDS is faster and more powerful than any previous version of IDS—including IDS 7.31. That’s the message from companies that have upgraded to IDS 9.4 and have shared their results with IBM. By offering enhanced performance, scalability and availability capabilities, IBM IDS 9.4 is also helping companies to increase their revenues and lower their operational costs.

To find out just how much customers are benefiting with IDS 9.4, IBM studied the experiences of companies that have upgraded to IDS 9.4. This white paper, which reports the results of this research initiative, shows how IDS 9.4 is enabling companies to drive enterprise-wide efficiencies and faster transaction processing, leading to better business results.

**Rationale and methodology**

While IBM IDS 9.4 exceeds the performance levels of IDS 7.31, many IDS customers are still working with IDS 7.31, despite the fact that growing transaction loads have been straining the IDS 7.31 engine. Although a great deal of information has been published about IDS 9.4, IBM assumed that these companies had not received the information that they needed to make the decision to upgrade.

To help these companies make an informed decision on whether or not to upgrade to 9.4, IBM did an initial survey of 25 IDS 7.31 customers. The questionnaire asked whether these companies had performed the upgrade to IDS 9.4, and if they had results to share with us.

Many of the 25 customers indicated that they had not yet upgraded to IDS 9.4, in some cases reporting that they were waiting to hear more results from those who had. Other companies could not participate due to internal reasons. Three companies answered that they had performed the upgrade and were willing to participate in a study focusing on the results. While the focus of this white paper is on customers who upgraded to IBM IDS 9.4 from earlier versions of IDS, we also have included one company that upgraded to IDS 9.3, prior to the release of 9.4, to meet other business and technical time constraints. With assistance from IBM the company was able to customize the existing 9.3 technology to optimize performance equal to that found in Version 9.4.

During in-depth telephone interviews, we asked each of the four companies to elaborate on the following questions:

- How does IBM IDS fit into your business operations?
- What were the business drivers that motivated you to upgrade to the new 9.4 (or 9.3) release?
- What changed in terms of application performance and business results?

All four companies reported that they decided to upgrade to IDS 9.4 to better align their IT infrastructures with their business processes and achieve significant savings or increased revenue. Since some of these challenges may mirror your own situation, IBM is presenting these customers' experiences to provide the IDS user community with relevant peer information.

The companies studied in this white paper are:

- El Salvador Tax Authority (Dirección General de Impuestos Internos, or DGII)—1,000-employee government agency under the El Salvador Ministry of Finance responsible for collecting taxes from 1 million taxpayers in El Salvador.
- Transportation Clearing House LLC (TCH)—200-plus employee provider of financial services, such as credit cards and credit card management software, to the trucking industry.
- Choice Hotels International, Inc.—a 1,600-employee franchisor of hotel chains with more than 5,000 open or under development hotels worldwide under the Comfort Inn<sup>®</sup>, Comfort Suites<sup>®</sup>, Quality<sup>®</sup>, Sleep Inn<sup>®</sup>, Clarion<sup>®</sup>, Mainstay Suites<sup>®</sup>, Econo Lodge<sup>®</sup> and Rodeway Inn<sup>®</sup> brands.
- Intraware—public company (NASDAQ: ITRA) providing Internet-based delivery and support solution that enables technology companies to deliver, track and manage the software, licenses and other digital content they distribute to their global customer bases.

**Improved efficiencies, increased revenues**

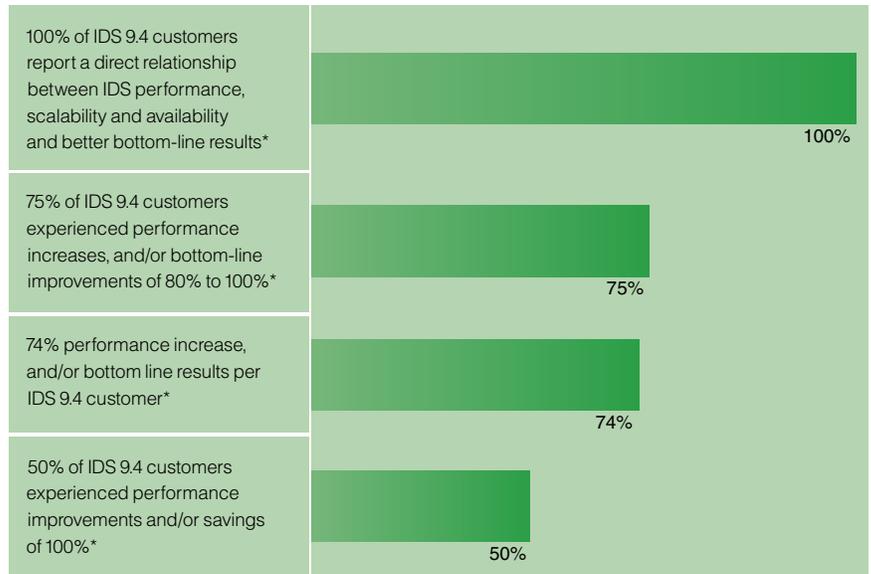
Better performance, scalability and availability with IDS 9.4 (and in one case IDS 9.3) resulted in savings, improved efficiencies and/or increased revenue in all of the companies surveyed. Moreover, IDS 9.4 is helping these companies manage growth and become on demand businesses. IBM defines an on demand company as “an enterprise whose business processes — integrated end-to-end across the company and with key partners, suppliers and customers — can respond with speed to any customer demand, market opportunity or external threat.” As a result of migrating to IBM IDS 9.4, these companies have become on demand businesses and can now better respond to the demands placed on their transaction processing systems by customers or employees who perform mission-critical business processes.

For instance, Choice Hotels International, Inc. increased the performance of its business systems, enabling the company to capture more business from customers and to partner with third-party Internet reservations companies, potentially increasing its revenues even further. DGII and TCH were able to increase their scalability and operational efficiencies, helping to prevent loss of revenues and increasing their ability to do business on a larger scale. For instance, DGII can maintain 10-year tax histories of taxpayers, and TCH can do business with larger carrier customers. Intraware continues to improve the performance and availability of its customer-serving applications, attracting new customers without adding to its database administration staff.

In addition to yielding quantifiable gains, certain improvements in productivity and efficiency sometimes do not have a measurable effect on the bottom line, yet are highly valued by management. For instance, with increased efficiencies TCH can strike larger partnership deals and DGII can improve the efficiency of its employees, freeing them to perform value-added tasks.

We have summarized the experiences of the following companies to show their results:

- El Salvador Tax Authority is experiencing 80 percent faster data processing, strengthening its capabilities to maintain government revenue flows. Also, faster data loading speeds has resulted in 30 to 40 percent savings in database maintenance operations.
- Transportation Clearing House is now able to respond to the requirements of its customers (principally oil companies) by guaranteeing 99 percent availability. As a result, new customers are signing up with TCH at an impressive rate, causing revenues to grow by 100 percent without requiring an expansion of the data management staff. In addition, the company can bring its applications to market faster because archiving data takes 80 percent less time, increasing employees' productivity.
- Choice Hotels International, Inc. doubled the processing speed of its Central Reservation System database, enabling it to also double the number of bookings and respond to customers in real time, on demand. This 100% improvement in transaction processing speed enables Choice to process transactions from large-volume providers such as Orbitz and Expedia.
- Intraware increased database performance by proactively implementing new IBM IDS versions, improving customer satisfaction by providing faster overall response time for its Internet-based service application. The company is also saving critical time for its database administrators by utilizing Informix's support for large file sizes and improved replication utilities. By improving performance and maintaining a low TCO, Intraware can scale its operations while it continues to grow as the market leader in providing Electronic Software Distribution (ESD) and electronic licensing services to software developers.



**Figure 1.** Analysis of customers' results after migration to IDS 9.4\*

\*Calculations based on 100% increased business for Choice Hotels International, Inc. and TCH, 80% performance increase for DBII and 15% performance increase for Intraware. We have included the results of Choice's migration to IDS 9.3 because the software was modified to resemble IDS 9.4. Also, we have revised the 100 percent increase in revenues experienced by Choice to 33 percent because it was the result of three factors, only one of which is related to IDS.

### Performance improvements

The IDS 9.4 engine represents the next evolution of a database technology first released in 1994 when Informix introduced the Informix Dynamic Scalable Architecture (DSA), and combined it in 1998 with object-relational technology. Then and now, Informix DSA delivers mainframe-caliber scalability, manageability and performance, minimal maintenance requirements and automatic workload distribution.

The 9.4 release features a number of architectural changes that are responsible for unprecedented performance. For instance, new B-tree scanning, buffer cache management, high availability data replication (HDR) and enterprise replication (ER) result in faster processing, leading to demonstrable business benefits.

**IDS 9.4 technological improvements discussed in this white paper**

The four customers interviewed in this white paper reported improvements such as:

- **Buffer cache manager**—To help prevent the buffer cache from being consumed by indexes or memory resident pages, IDS 9.4 includes a new buffer management algorithm that balances the needs of high-priority and low-priority buffers. The buffer priorities are not fixed as in IDS 7.31, but are based solely upon access frequency. The result is that the more “popular” a page/buffer is, the more likely it will stay cached. This will help minimize the need to retrieve a popular page off disk.
- **B-tree scanners**—IBM IDS 9.4 introduces a new concept in B-tree scanners. This allows the configuration of one-to-many multiple B-tree scanners to improve the cleaning and maintenance of the B-tree structure of an index. The new B-tree scanner algorithm prioritizes indexes to be cleaned based on which B-tree has caused the engine to do the most work. The result is faster performance, as well as a more efficient index structure.
- **Large chunk/file support**—Compared to IDS 7, the maximum number of chunks (units of storage) has been increased from 2,048 to 32,767. The maximum size of a chunk has been increased from two gigabytes to four terabytes. The total capacity of a single instance of the database is just under 128 petabytes—about one quadrillion bytes. Larger chunk size facilitates easier database management, while large database size results in dramatically increased scalability.
- **High availability data replication (HDR) and enterprise replication (ER)**—HDR and ER data replication technologies ensure availability. Previously, their use had been mutually exclusive. By integrating these technologies, companies can achieve impressive availability metrics.

<b>Database results</b>	<b>Technological improvements</b>
Performance	Buffer cache management B-tree scanners
Scalability	Larger database capacity
Availability	HDR and ER integration
Low maintenance	Increase in chunk size limits

**Figure 2.** *What drives the key technological improvements of IDS 9.4?*

In addition to the technologies just discussed, IDS 9.4 also eliminates, simplifies and automates many tasks typically associated with an enterprise-class database, which helps businesses to lower their total cost of ownership (TCO). In fact, upgrading to IDS 9.4 is itself an automated task, and can be performed within a relatively short timeframe. Once the system performs the requisite upgrade activities, your database administrators (DBAs) can conduct testing and backup activities, shut down the database engine and then restart it quickly to take advantage of the new features. DGII, for instance, upgraded its database to IDS 9.4 in two days, one day ahead of schedule.

**Customer experiences with IBM IDS 9.4**

**El Salvador Tax Authority (DGII)**

Upgrade	IBM Informix Dynamic Server, Version 7.3 to IBM Informix Dynamic Server, Version 9.4
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The El Salvador Tax Authority (DGII) is part of the El Salvador Ministry of Finance. With 1,000 employees in 17 offices, DGII collects excise, liquor, cigarette and value-added taxes as well as personal and business income taxes. DGII annually evaluates and processes tax returns linked to almost one million taxpayer identification numbers. DGII also processes some 60,000 sales tax returns monthly.

Not long ago, the IDS 7.31 database supporting the bureau’s tax database, which contained 10 years of information on the country’s taxpayers, had run out of capacity and was posing scalability and reliability problems. The probability existed that data and revenues would be lost. Moreover, DBAs had to spend time working around the situation, often denying users access to data for hours at a time, reducing productivity.

“Information is priceless to a tax authority, so the need for a reliable, scalable information management system to perform transaction processing and store years of data is obvious,” says Jim Westrick, a DGII technical consultant. “DGII’s system was clearly not going to satisfy its critical storage and performance requirements going forward.”

**Resilient new system fosters organizational responsiveness**

DGII upgraded its tax infrastructure to IBM IDS 9.4 running on the Linux operating system. The actual conversion took just 48 hours and was completed a full day earlier than planned, despite the challenge of migrating 200 million records.

Recalls Westrick, “By enabling faster loading, the support of IDS 9.4 for data chunks greater than 2 gigabytes was the key element in the success of the upgrade, and it’s probably the software’s biggest advantage. Since the upgrade, IDS 9.4 on the Intel server using Linux has performed admirably.”

**A reliable database with room to grow**

Thanks to the new solution, database inefficiency and poor availability no longer plague DGII system users and DBA staff. With IDS delivering 80 percent faster performance for most standard reporting and posting functions, the processing of tax forms now takes 40 minutes instead of 4 hours. Maintaining the database is also easier, in part due to 30 to 40 percent faster load speeds. In addition, fewer storage restrictions with IDS have enabled easier backups, including backups to disk and tape.

Says Francisco Rovira, the authority’s general director of internal taxes, “Storing 10 years of tax records on a safe and reliable platform is vital to the operations of El Salvador. By leveraging the capabilities of IDS 9.4, which assures more reliable backups and support for our database platform, we are well prepared to handle future data growth.”

**Choice Hotels International, Inc.**

Upgrade

IBM Informix Dynamic Server, Version 7.31 to

IBM Informix Dynamic Server, Version 9.30

Based in Silver Spring, Maryland, Choice Hotels International, Inc. (Choice) is one of the world's largest lodging franchisors, with more than 5,000 hotels open or under development in 44 countries under the Comfort Inn, Comfort Suites, Quality, Clarion, Sleep Inn, MainStay Suites, Econo Lodge, and Rodeway Inn brand names.

With almost half a million rooms, Choice needed to upgrade its IBM IDS 7.31 database system to support the chain's reservation systems. Since the database could not keep up with steadily increasing demands on the reservation system, Choice was missing business opportunities. And not only did it have to keep pace with its own marketing operations, it was also about to welcome online customers from Orbitz and Expedia Web-based travel services, so a performance increase was mission-critical.

At the same time, the database was running on the Solaris 2.6 operating system and had to be upgraded to Solaris 2.8 to continue support with the hardware vendor. The company made a decision to go with the 64-bit version of the operating system, increasing the complexity of the upgrade. The limited times available for maintenance windows on the reservation system did not allow for multiple upgrades for each of the components.

However, Choice had no reservations about which database to choose. "We never considered moving to another database," says Deborah DeCorrevont, director of database systems, Choice Hotels International, Inc.. "We are very happy with the performance and reliability of Informix Dynamic Server."

Choosing to upgrade to IDS 9.30 because the company did not want to wait for Version 9.4 and miss meeting the operating system upgrade requirements, Choice got the performance it wanted. That's because the upgrade took advantage of improvements to IDS 9, along with assistance from IBM support services. Choice worked directly with IBM Research and Development teams, using the Choice production database, to tune the update statistics to leverage the new 9.3 technology.

Another customization for Choice involved the IDS 9.30 optimizer, which had been designed to provide flexible parameters for decision-support users. However, this feature actually slowed down the database for OLTP transactions, so IBM developed a patch that would sidestep these new parameters and speed up the calls to the 9.3 optimizer. IBM also provided the company with a temporary license for an additional processor to bolster performance during these adjustments. "With IBM's help, we got a big boost in performance," says DeCorrevont. "We are really interested in speed and speed alone. With the outstanding support of IBM, we accelerated the speed of the Informix engine, by approximately 100 percent. Thanks to IBM, we had an IDS 9.4 look-alike before the 9.4 release actually became available and were able to complete our operating system upgrade as planned."

Convinced that IBM's roadmap for the development of IBM IDS matches its own business needs for increased performance, Choice Hotels is planning to upgrade to IDS 9.4 in the near future.

"IBM's support for Informix has been a critical factor to us in our evolution and growth," says DeCorrevont. "By incorporating industry-leading database technology, IBM has transformed IDS from a product that seemed to be without a future, to a leading-edge database that helps to make us cost-competitive. You can't ask for more than that."

**Transportation Clearing House**

Upgrade

IBM Informix Dynamic Server, Version 7.2 to  
IBM Informix Dynamic Server, Version 9.4

Based in Ogden, Utah, Transportation Clearing House LLC (TCH), provides a variety of services to the trucking industry. These services range from credit cards to financial services for trucking carriers. Processing credit card transactions at approximately 3,400 truck stops throughout North America accounts for approximately 45 percent of TCH's \$7 billion yearly revenues.

Carriers and oil companies, which comprise the majority of TCH's customers, will sign up with TCH only if it can provide service level agreements (SLAs) of 99 percent. "Since high availability is so important to us, we strive to incorporate software and hardware that keeps us up and running 24x7," says Stephen Cobb, Manager of Systems and Technology at TCH. "The 9.4 release of IBM Informix Dynamic Server has had a tremendous impact on our business performance. It has enabled us to run at 99.997 percent availability since we installed it, and now we can guarantee our customers 99 percent availability in our SLAs. This has enabled us to sign up more customers. We receive a fee for each transaction, and transactions double nearly every year as has our revenues," says Cobb.

**Driving new business to the pump**

A longtime Informix user, TCH has welcomed the new Informix release and recently upgraded to it from Version 7.2 to enjoy its dramatically enhanced availability. With IDS 9.4, TCH can maintain a high availability data replication (HDR) solution for immediate fail-over to a hot standby in its emergency recovery center in Scottsdale, Arizona. At the same time, the IDS enterprise replication (ER) feature replicates subsets of data throughout the enterprise to optimize availability and performance. Using both these features together ensures maximum availability for TCH's mission-critical applications.

**Getting new applications to market faster**

In addition to its enhanced availability features, IDS 9.4 also enables TCH to reduce the time it takes to perform its nightly archiving by more than 80 percent. This is due to the new version's ability to support a larger, four-terabyte chunk size instead of the two-gigabyte limit in the previous version. "We can perform a level-zero archive to disk without having to worry about file size limitations," says Cobb. "Now, instead of archiving taking five to six hours, we can do it in less than an hour. By shrinking the archiving window, we can improve the productivity of our own staff and get products to market more quickly."

**Lower TCO for IDS**

With minimal maintenance requirements, IDS 9.4 presents the strongest value proposition in the industry, according to Cobb. “We sell technology, so we’re looking at the cost of our solutions very closely,” he says. “If you choose Oracle or another database, your incremental costs really go up because you need more database administrators.

“An important savings with IDS 9.4 is the reduced staffing requirement for database administration. In our case, we were able to double our business without increasing our operational expenses at all. The total cost of ownership with IBM IDS still makes it the best buy out there. With the added value of all the enhancements in IDS 9.4, IBM has provided us with a singularly attractive database offering.”

**Intraware, Inc.**

Upgrade	IBM Informix Dynamic Server, Version 9.3 to IBM Informix Dynamic Server, Version 9.4
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Orinda, California-based Intraware, Inc. (Intraware) helps enterprise software developers distribute their products online to customers world-wide, including to over 86% of Fortune 500 companies. With its SubscribeNet service for secure electronic delivery of software and licenses, Intraware manages entitlements—subscriptions, contracts, renewals—from all sales channels, including direct, reseller and e-commerce. The end-user customer activity creates aggregated business statistics to empower software developers to effectively manage customer relationships. The number of users who access Intraware SubscribeNet to download software and licenses tops 1,000,000.

Since its inception, Intraware has used IDS to manage all its accounts using online transaction processing (OLTP) applications. The company also uses IDS to manage the copies of all the applications that it distributes. Since these files can be very large (IDS manages four terabytes of data for Intraware), the company requires a robust, scalable database that can grow with its business. Responding to customers' queries instantly is essential to keeping customers satisfied and attracting prospective customers. Moreover, Intraware also needs to keep down the cost of delivering its service, which includes maintaining its database.

#### **Fulfilling business objectives**

“Since so much depends on the quality of our database systems, we typically migrate to every new release of IDS, and with every migration since IDS 7.3 we have noticed significant improvements,” says Intraware’s Dana Carney, senior database administrator and team lead. Intraware’s migration to IDS 9.4 from IDS 9.3 has successfully helped the company to keep its technology infrastructure aligned with its business goals, improving performance and keeping down TCO. “IDS 9.4 is as much as 15 percent faster in responding to customer queries,” says Carney. “Combining the improvements we noticed with IDS 9.21 and IDS 9.3, the performance improvement is even larger. This translates into a significant gain in our ability to satisfy customers.” Behind the latest performance improvement is the enhanced buffer cache manager of IDS 9.4, which flushes excess index pages from the cache, causing faster database performance.

IDS 9.4 has also improved the performance of the IDS enterprise replication feature. Intraware instantaneously replicates all information coming into its data management system onto four servers, three for high availability and a fourth housing a data warehouse, which is used for business analysis. With faster replications, the availability of the database has improved, and business intelligence processes use real-time information, resulting in better decision-making.

**Controlling costs**

IDS also helps keep the cost of database maintenance low. Intraware has been able to increase the adoption rates of its ESD and ELD services year over year while holding the cost of administration and operations steady for the past four years. Improvements to IDS have had a direct impact on Intraware's successful ability to scale. The improvements in IDS 9.4 have not only helped to make the Intraware DBAs more efficient, it is actually freeing up more time for value-added work such as creating a new Ireland-based ESD center. The reason for this improved efficiency is the increase in chunk size limits to four terabytes in IDS 9.4 from the previous version's two gigabytes. With the higher size limits, the IDS DBAs are relieved of the task of breaking up files, which previously took hours or days, depending on the size and number of files to be processed.

"A technology company such as ours requires technology partners that are committed to helping us succeed in the marketplace," says Carney. "IDS 9.4 puts us in a more viable position competitively with improved service levels and fewer time-consuming maintenance chores. We are very satisfied."

**Conclusion: Built for growth**

The improvements built into IBM IDS 9.4 underscore IBM's commitment to provide the support Informix customers need to grow their businesses. This allows Informix customers to develop open standards-based operating environments to develop a resilient, on demand business capable of handling rapidly changing external environments.

IBM IDS 9.4 features scores of improvements that make it the right database for your enterprise. In addition to providing the performance that customers, employees and business partners demand, IBM IDS 9.4 offers you the opportunity to redesign your database infrastructure with minimal effort, and for maximum potential results.

**Find out more**

For more information about IBM Informix Dynamic Server 9.4 and the full spectrum of innovative IBM information management products and services, contact your local IBM representative or visit:

**[ibm.com/software/data/Informix](http://ibm.com/software/data/Informix)**



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Silicon Valley Laboratory  
555 Bailey Avenue  
San Jose, CA 95141  
U.S.A.

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12-04  
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 Printed in the United States on recycled paper containing 10% recovered post-consumer fiber.



G507-1469-00