Decision Support Applications Performance and Scalability Brief

Extreme Power and Scalability for large decision support applications

*Compaq AlphaServer systems with Tru64 UNIX*

Understand your business. Understand your customers – each of them. Improve the operation of the business. Increase your ability to respond to specific customer requests and treat each customer as a unique individual. And minimize the investment required to accomplish all of this. These are today’s imperatives for business survival.

To be successful in any of these endeavors requires data – usually lots of data. The more data the better. As the business grows, the amount of data grows. To be useful to the business, this data needs to be processed and analyzed – the quicker, the better. The applications that enable the business to meet these requirements must manage and process large amounts of data, must analyze it quickly, must have the flexibility and capacity to respond rapidly to tomorrow’s unpredictable events and do all of this cost-effectively.

Compaq and Informix have a system that has these characteristics. It has the capacity to manage very large amounts of data, the power to analyze it rapidly, it can be always available, and it has the flexibility to change with rapidly changing business requirements while protecting your investment in the system. Compaq and Informix have demonstrated these characteristics by completing the new industry standard 1TB TPC-H benchmark. The results of this benchmark of a very large, complex business analysis application are relevant to today’s business challenges because they demonstrate that a system combining Compaq and Informix leadership technologies provides:

- Very large capacity to manage and process data including that which results from the explosive business growth often experienced by eBusinesses
- Superior processing power to process and analyze more data, quicker to enable more rapid decision making
- Extraordinary power for large capacity NonStop™ solutions that can simultaneously be always available whenever Internet users arrive
- Leadership-integrated, tested products that are a solid foundation for the most demanding, leading-edge, business-critical eBusiness applications delivered by the on-going, strong Compaq and Informix partnership

By being the first to deliver results for the 1TB TPC-H benchmark, Compaq and Informix have shown their commitment to provide leadership products that can deliver the extreme power and scalability required to meet the most stringent requirements of very large decision-support applications. Many business intelligence, Customer Relationship Management (CRM), eBusiness and data-warehousing applications require this extreme power and scalability today or will sometime in the future.

More Power and Capacity than other Systems

By completing the 1TB TPC-H benchmark, the Compaq and Informix system has demonstrated more power to process complex queries and analyses and more capacity to manage and analyze large amounts of data than any other RISC/UNIX system. Specifically, the Compaq and Informix system demonstrated more than 3.9 times the power of the HP 9000 V2500 system that ran the 300GB TPC-H benchmark.
data, so the database for the 1TB TPC-H is more than three times as large. But more important, each user query must analyze more than 3.3 times as much data.

In addition, the TPC-H benchmark includes the requirement to run multiple query streams concurrently. Each query stream includes all of the TPC-H business analysis queries. As the size of the TPC-H benchmark raw data increases, the number of concurrent query streams also increases. At 1TB of raw data, the Compaq and Informix system processed seven concurrent query streams. This is a 17% greater processing load than the HP V2500 running the 300GB TPC-H benchmark with six concurrent query streams.

Combining the greater amount of data with the increased processing requirements of the 1TB TPC-H benchmark over the 300GB TPC-H benchmark, the Compaq and Informix system ran a workload requiring 3.9 times the processing power of the HP 9000 V2500 system with the Informix database.

**Superior Power for Large Databases**

With their superior Alpha processors Compaq AlphaServer systems with Tru64 UNIX provide the best processing power to analyze large volumes of data for the most complex, demanding decision-support queries. Business reporting users run standard queries to see the latest business status and understand trends. Power users follow their intuition and the results of their latest queries to generate the next request for information in their quest for new insights into the business. Compaq systems provide exceptional processing power for any business analysis.

Compaq and Informix have delivered the first TPC-H benchmark results at 1 TB scale factor and they clearly demonstrate the leadership of the joint Compaq and Informix database server solutions. They are the first to conquer this new, demanding industry-standard stress test of decision support systems that query very large databases.

The 1TB TPC-H benchmark, which models a real world decision support environment of multiple users running complex ad hoc queries of a database, tests the power and scalability of a system to address very large, complex and processing intensive business analysis requirements. The stress test showed that the combination of Compaq's AlphaServer GS140 systems running Tru64 UNIX with a StorageWorks SAN and Informix Extended Parallel Server achieved 6,514 QphH@1TB (Queries per hour H) at $2,171/QphH@1TB (price/performance). These exceptional 1TB TPC-H benchmark results underscore how Informix XPS leverages Compaq’s Tru64 UNIX clustering, AlphaServer GS140 systems and StorageWorks to meet the high performance, large capacity and extreme scalability requirements of today’s business intelligence and data warehousing applications. And the complete system that generated these results is available today.

Executing the 1TB TPC-H benchmark requires lots of processing power, analyzing lots of data that needs to come with very large I/O bandwidth from lots of storage. While running the 1TB TPC-H benchmark, the system rapidly processes many medium-to-complex user ad hoc queries concurrently and two database refresh functions. The TPC-H query processing examines a very large percentage of the data in the database, so the entire system is stress tested including the ability of the storage system to supply data fast enough to keep the world’s fastest processors - Alpha - busy. For the Compaq and Informix 1TB TPC-H
run times. For applications that can take advantage of multiple processors concurrently, faster Alpha processors usually deliver better application run times.

- **Shorter time and more cost effective application implementation**
  With the most powerful processors, there is no need to perform complex, labor intensive application tuning for dynamic multiuser application environments -- the faster processors just run applications faster.

- **A more robust, reliable system**
  *Compaq AlphaServer* systems have the best processing power for the most compute intensive tasks, run applications better, and have fewer modules to fail.

- **More cost effective to upgrade**
  Each Alpha processor added to a system provides more performance than other systems, and with fewer processors to change to a higher speed, a performance upgrade may be more cost effective.

*Compaq AlphaServer* systems with Alpha processors deliver all of these advantages for the complete spectrum of business intelligence applications.

**Superior Alpha Power for Exceptional Advanced Business Analysis**

When the requirements for business data analysis extend beyond decision support queries of a large database, the superior Alpha processor power of *AlphaServer* systems continues to deliver extraordinary results for knowledge workers. In order to maintain their train of thought, knowledge workers exploring data need a quick response to their requests. This is especially challenging when they are employing analytical processing and data mining methods that employ lots of analysis of the data. As their business models increase in sophistication and analyze growing mountains of data, fast processing of the data becomes even more crucial. *Compaq AlphaServer* systems with their superior Alpha processor power, *Tru64 UNIX*, *Compaq StorageWorks*, and Informix are a perfect fit for these applications.

**Always Available Applications with Large Capacity**

One of the most challenging aspects of eBusiness applications is the necessity of having the application available for users at any time – there are no off hours. Informix products combined with *Tru64 UNIX* TruClusters and *AlphaServer* GS systems enable high performance and exceptional scalability with concurrent high availability for *NonStop™* eBusiness applications that always need to be available.

The total system that powered the Compaq and Informix 1TB TPC-H benchmark is a cluster of multiple SMP systems working together to support this very large, very demanding business analysis application. This clustered computing environment can also provide applications that are always available. With their unique advanced cluster management capabilities, including a single cluster wide file system and single system image, as well as excellent resource utilization using cluster-wide login, *Tru64 UNIX TruClusters* are a more cost-effective and more reliable environment for applications that must always be available. Combined with Informix XPS they create a cost-effective, ultra-high availability, high performance system supported by superior manageability. By completing this 1TB TPC-H benchmark, Compaq and Informix have demonstrated that this ultra-high availability clustered computing environment also delivers the extreme computing power and scalability to support the demands of applications that manage and analyze very large databases.
StorageWorks, and Informix XPS. The system stress tested with the 1TB TPC-H benchmark is an eight node cluster of Compaq AlphaServer GS140 6/700 systems with a 15TB Compaq StorageWorks SAN running Tru64 UNIX and Informix XPS. According to industry analysts, Tru64 UNIX on AlphaServer systems is the highest performing and most scalable, reliable, and robust UNIX system on the market today. The Informix database complements Compaq Tru64 UNIX systems to provide a high-performance, scalable and ultra-high availability environment for leading-edge decision support applications. Informix XPS is a powerful, parallel database that takes advantage of the Compaq cluster technology. It can directly access the Compaq high-bandwidth, low-latency memory channel cluster interconnect to maximize overall system throughput.

The results of this exercise clearly demonstrate that the combination of Compaq and Informix can provide decision support applications which deliver maximum productivity for knowledge workers, and can cost-effectively analyze and manage the growing mountains of data being generated by expanding businesses. This makes it the ideal system to power today’s leading edge decision-support applications – those that are on-line serving users all the time, all over the world through the Internet.

Building and exploiting leading-edge Internet enabled applications requires worldwide resources and experience. Compaq’s industry-renowned worldwide multivendor service organization provides first-rate support for complex, global, networked computing environments. Compaq is one of a few select providers that have the resources and experience needed to act as a single source of accountability for your total enterprise IT services solution. Compaq is ready to support you in the way that best suits your computing and business environment.

**Improving Business Performance**

Improving business performance is necessary for success in today’s fast paced world. The results of this testing demonstrate that Compaq with its partners can deliver decision-support applications that increase user productivity, and cost effectively scale to support growing businesses. The superior processor power of Compaq AlphaServer systems with Tru64 UNIX is beneficial to people performing decision support, business analysis and data mining. Rapid response to their queries, quick completion of their analyses and fast runs of their models all while processing large amounts of data make users more productive and increases their ability to unlock new ideas for improving business performance.

The opportunity to grow a business rapidly, enhance business performance and understand customers better by turning data into knowledge is driving companies to invest in business intelligence and customer relationship management applications. The business world is changing rapidly. The competitive advantage often goes to the business that moves the fastest. Compaq with its partners can help you move fast.

**TPC-H Benchmark Description**

The TPC-H benchmark is designed to stress test a system to determine its ability to support and its cost/performance for decision-support applications. It models an environment of complex business analysis applications in which complex ad hoc business-oriented queries are submitted against a database with concurrent data modifications.
“trickle” update streams. Because the decision-support environment is accessed by users worldwide, the database must be available for queries 24 hours a day, 7 days a week. At the same time, the database must be kept reasonably in sync with its operational data source. Therefore, in addition to the set of read-only queries, the TPC-H benchmark includes two refresh functions to model the concurrent database maintenance activity. One refresh function is a series of inserts and the second is a series of deletes.

The Transaction Processing Performance Council (TPC) maintains the TPC-H benchmark specification and monitors the publication of benchmark results. The TPC-H benchmark was recently adopted by the TPC to measure real world ad hoc query performance better than the TPC-D benchmark that it replaces. More information about the TPC and the TPC-H benchmark may be found at the TPC web site at tpc.org.