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**Unisys ES7000 Server Delivers a Robust, Scalable SAP Solution  
for Windows 2000 with Outstanding Price-Performance**

**Executive Summary**

Unisys has a well-established heritage of understanding the requirements of and building solutions for the enterprise data center and is applying its experience building transaction processing systems to improve the mission-critical characteristics of the Windows operating environment. In recent years, Unisys has been on a crusade to deliver mainframe-class performance on the most scalable and reliable Intel-based servers available in the industry. Whereas an Intel-based, Microsoft (Wintel) operating environment has always delivered outstanding price-performance at the low end, until recently there have been limits to the scalability of a Windows-based platform and in its ability to exhibit the reliability/availability/serviceability (RAS) and manageability characteristics required for mission-critical computing.

Unisys has identified SAP as a key partner for obvious reasons: SAP is a market-leading supplier of e-Business application software, and its users have been seeking a hardware solution capable of providing enterprise-class performance and reliability on the popular, cost-effective Wintel platform. Recent SAP benchmarks have demonstrated the impressive scalability and price-performance of the Unisys e-@action Enterprise Server ES7000 — a 32-processor system running Microsoft's Windows 2000 Datacenter Server operating system. The scalability confirmed by a series of mySAP.com Sales and Distribution (SD) Standard Application Benchmarks is unprecedented with any platform — Windows or Unix — and the price-performance advantages of an Intel-based solution are borne out as well. The price-performance of the Unisys ES7000 database server (20,000 SD benchmark users) was nearly three times better than the Sun E10000 (19,360 users) — \$44.16 per user for the ES7000 versus \$127.51 per user for the E10000.

Aberdeen concludes that Unisys e-@ction servers are the only Wintel servers on the market capable of achieving the highest performance levels for mySAP.com e-Business applications. Furthermore, its price-performance and reliability characteristics make it an attractive alternative to high-end Unix systems.

### **Unisys e-@ction Servers Bring Microsoft into the Data Center**

Unisys has built the most powerful, scalable, Intel-based server available today, specifically the e-@ction Enterprise Server ES7000. The ES7000 is based on the Unisys Cellular MultiProcessing (CMP) architecture that has scaled the Microsoft software platform well beyond its previous limits. CMP is an innovative hardware design based on Unisys Scalable Crossbar Interconnect, which is capable of 20 gigabytes (GB) per second sustained memory bandwidth — a frequent bottleneck in other Symmetric MultiProcessor (SMP) architectures.

Mission-critical e-Business requires not only scalability to support high-volume, Web-based transaction processing, but also the reliability, serviceability, and manageability characteristics associated with legacy data center solutions. Unisys has worked with Microsoft to implement out-of-the-box “cluster-aware” solutions, based on Microsoft Cluster Server, that support automatic failover between nodes, each of which can have its own independent workload. By further utilizing redundant hardware and network infrastructure components and fault-tolerant storage, Unisys can deliver a high-availability configuration suitable for mission-critical e-Business.

Systems management is another area where today’s Unisys customers benefit from the Unisys heritage in data center computing. There is a common misconception in the Information Technology (IT) industry that hardware and system software failures account for the majority of unplanned downtime. But, in fact, as much as 40% of unplanned downtime is the result of application failures, and another 40% results from operator errors. While the integrated Unisys-SAP clusters facilitate recovery from application errors, Unisys has addressed operational problems with its Enterprise Server Software (ESS), which provides simplicity — i.e., consolidated system management through a single console; flexibility through remote administration; and high availability, allowing processor re-assignment without operator intervention. Unisys has developed systems management applications to automate routine operations — such as event logging and reporting and output file management — for multiple distributed systems.

A significant systems management advantage for Windows 2000 systems administrators results from the unprecedented scalability of the Unisys CMP architecture and the opportunity for server consolidation. Enterprise IT executives have always been uncomfortable with having to manage upward of 100 servers, as the management complexity and staffing costs can be prohibitive. Unisys e-@ction Enterprise Server scalability and ESS Systems Management directly address this concern with a simplified, consolidated approach.

**Performance and Price-Performance: The Sizzle with the Steak**

High availability is absolutely essential for mission-critical e-Business, but performance is the sizzle that grabs the headlines. For Windows 2000 and its SQL Server 2000 database to be truly judged as “ready for prime time” in the enterprise, scalability above the level of the commodity 4- and 8-way systems was required. Unisys has been a pioneer in the scaling of Windows NT; dating back to 1998, Unisys Aquanta 10-way servers had been certified by SAP and represented the largest Intel-based enterprise server for the Windows NT environment. But, since February 2001, Unisys has reinforced its position as the “benchmark gorilla” — it claims the leading Windows results in nearly all application benchmarks: SAP, PeopleSoft, voicemail, video streaming, Exchange, Siebel, and thin client access — with a series of four high-end, three-tier SAP SD application benchmark results that should quiet the Microsoft scalability skeptics once and for all.

On June 12, 2001, Unisys announced a result of 20,000 SD benchmark users on a 32-processor, 900 MHz ES7000, the highest Windows 2000 result to date and the second highest result on any platform — Windows or Unix. (This result is second only to a 64-processor Fujitsu Siemens database server running Solaris 8 on a Sparc architecture, which recorded 23,000 users in November 2000.)

*NT Price-Performance Before the ES7000: The Tea Leaves Revisited*

The price-performance advantage of a Wintel-based platform has been acknowledged for years. In May 1998, Aberdeen Group published a report, *Price-Performance of Unix and NT Systems: Reading the SAP R/3 Benchmark Tea Leaves*, which analyzed the SAP SD benchmark results of four Unix systems and seven Windows NT systems. The report concluded that “the price-performance of NT-on-Intel systems is 3-8 times better than the price-performance of Unix systems, based on SAP benchmark results.” But the report also stated that “NT systems do not yet meet the high-end R/3 performance requirements.” The highest SD benchmark result on Unix at that time exceeded 6,000 concurrent users, whereas the highest Wintel result was only 1,600 users.

The prevailing market belief in 1998 held that Windows NT was not reliable enough for high-end, mission-critical applications. For IT executives implementing SAP R/3, the implication was clear: There was money to be saved with “commodity-like” Wintel infrastructures (2-way and 4-way) for SAP as long as the application’s scalability and mission-critical requirements were not too severe.

*Unisys Benchmark Results: The Gorilla Reads the Tea Leaves*

Today, the prevailing market climate concerning whether Windows 2000 is as scalable and reliable as Unix could best be characterized as one of “healthy debate.” Advances by Microsoft and its partners — both in Windows 2000 and SQL Server 2000 — have fed this progress. With its CMP architecture, Unisys has led the way

among Microsoft's hardware platform partners. Its recent SAP benchmarks, culminating in the 20,000 SD user benchmark result, are a significant statement of scalability. Table 1 summarizes the four recent Unisys benchmarks.

**Table 1: Recent SAP SD Benchmarks on Unisys ES7000 Systems**

Database Server	Number of SD Users	Date certified by SAP
e-@ction Enterprise Server ES7000, 16-processor, Pentium III Xeon 700 MHz, 2 MB L2 cache, 8 GB memory	10,400	February 26, 2001
e-@ction Enterprise Server ES7000, 24-processor, Pentium III Xeon 700 MHz, 2 MB L2 cache, 8 GB memory	14,400	March 26, 2001
e-@ction Enterprise Server ES7000, 32-processor, Pentium III Xeon 700 MHz, 2 MB L2 cache, 12 GB memory	18,500	April 23, 2001
e-@ction Enterprise Server ES7000, 32-processor, Pentium III Xeon 900 MHz, 2 MB L2 cache, 12 GB memory	20,000	June 12, 2001

Source: Aberdeen Group, June 2001

These results are extremely important to Microsoft — and all Windows 2000 advocates for that matter. Not only has a Wintel system achieved absolute transaction processing performance on a par with the largest proprietary Unix configurations, but the results also demonstrate the scalability of the Unisys ES7000, a Wintel server. Whereas previously the benchmark “tea leaves” showed price-performance advantages on a Wintel platform for only small to midsize systems, Unisys has now demonstrated these advantages at the high end as well.

Table 2 presents relative scaling data from the four Unisys benchmarks. The three 700 MHz ES7000 benchmarks demonstrate impressive scaling. The number of SD users per processor decreases from 650 users per processor (for the 16-processor system) to 600 (for 24 processors), or 92%. But a measure of scaling should only

**Table 2: Unisys ES7000 Scalability Analysis\***

Processors	Speed	SD Users	Users per Processor	Scale Factor (for Additional Processors)	DB Server Cost per SD User
16	700 MHz	10,400	650	—	\$36.60
24	700 MHz	14,400	600	77%	\$39.75
32	700 MHz	18,500	578	78%	\$38.66
32	<i>900 MHz</i>	<i>20,000</i>	<i>625</i>	92%	<i>\$44.16</i>

\*Note: 900 MHz result typeset in italics.

Source: Aberdeen Group, June 2001

compare the *incremental* processors against pure linear scaling, in which case the additional eight processors added 4,000 users, whereas linear scaling would produce an additional 5,200 users, or 50%. This is a scale factor of 77% — still very acceptable. Similarly, moving from 16 to 32 processors reduced users per processor to 578, or 89% (of 650); and the incremental scaling for the additional 16 processors was 78%. Those who are familiar with scalability and the analysis of parallel processing know that linear scalability is rarely achieved with any application. These results demonstrate a level of SAP application scaling that has never been achieved by a hardware supplier — that is, before these Unisys benchmarks.

But this per-processor scaling analysis is really far less significant than the systems' price-performance. As the absolute performance level grows from 10,400 to 14,400 to 18,500, the cost of the database server per SD user remains fairly constant — between \$36.60 and \$39.75 — a true validation of the scalability of the ES7000. (This price-performance analysis focuses on the database server; more discussion follows.) The fourth result reflects the upgrade from a 700 MHz to a 900 MHz processor. Not surprisingly, the price-performance degrades by 14% to \$44.16 as the absolute performance soars to 20,000 SD users. (Though the additional 16 processors add 92% additional performance beyond the 16-processor result, this very high percentage is misleading and should be ignored, as all 32 processors have been upgraded to 900 MHz.) The price-performance analysis is expanded in the following section, which compares the four Unisys results with two Unix platform benchmark results.

*Database Server Price-Performance: ES7000 vs. Unix*

The price-performance of the Unisys systems in the SAP SD benchmark is compared with that of two Unix systems — a 64-processor Sun E10000 that produced 19,360 SD benchmark users and a 24-processor IBM RS/6000 S80 (Table 3). The Fujitsu Siemens result was not included in this analysis because pricing data was

**Table 3: SAP R/3 SD Benchmarks — Price and Performance Summary**

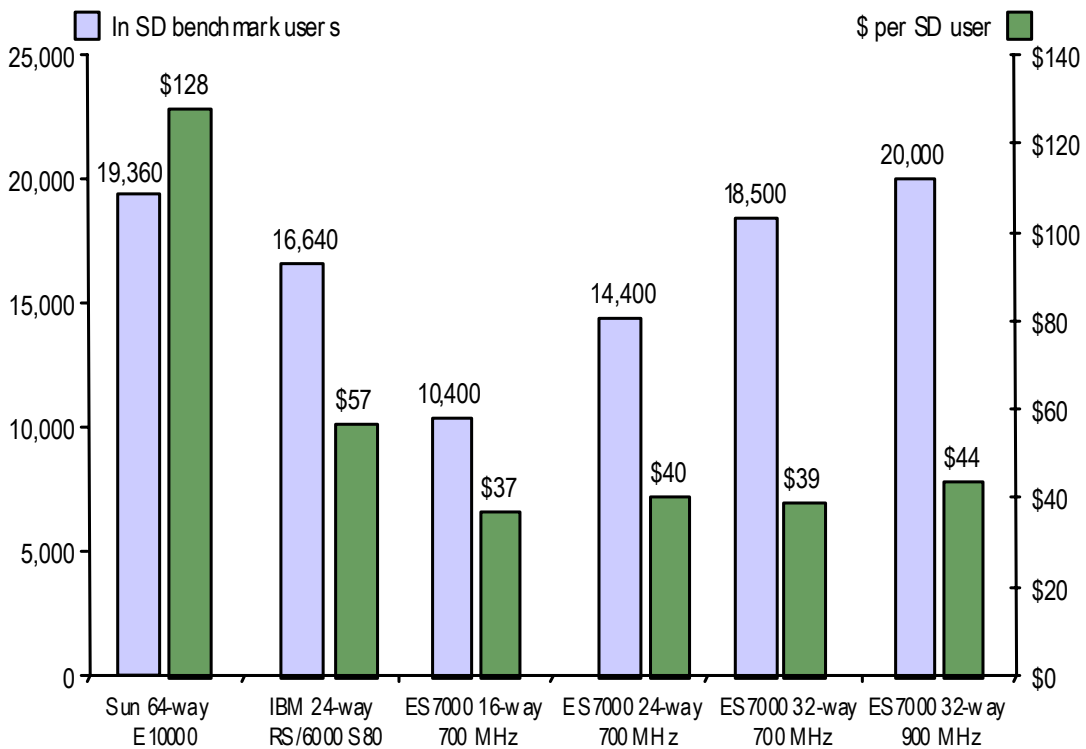
SAP Benchmark (Date)	SD Users	DB Server Cost	DB Server Cost per SD User	CPU Utilization of DB Server
Sun E10000 64-Way (March '00)	19,360	\$2,468,590	\$127.51	96%
IBM RS/6000 24-Way (September '99)	16,640	\$949,181	\$57.04	99%
ES7000 16-Way (February '01)	10,400	\$380,600	\$36.60	99%
ES7000 24-Way (March '01)	14,400	\$572,400	\$39.75	89%
ES7000 32-Way (April '01)	18,500	\$715,200	\$38.66	94%
ES7000 32-Way (June '01)	20,000	\$883,200	\$44.16	94%

Source: Aberdeen Group, June 2001

not readily available, though it was expected to have similar price-performance characteristics to the Sun system. Both are Sparc-based. Figure 1 shows the SAP SD benchmark absolute performance of the six configurations — along with the database server price-performance.

The price-performance analysis included the database server alone — ignoring the disks and application servers. In these SAP SD benchmarks, the database performance is the throttle. Benchmark configurations incorporate sufficient disks and application servers to push the database to its limit. Whereas the CPU utilization in the six benchmarks range from 89% to 99% (96% and 99% for the Unix systems, leaving even less headroom than the Unisys 24- and 32-way systems), the average application server CPU utilization was nowhere near capacity — 63% for Sun; 93% for IBM; and 62%, 59%, 57%, and 55% for the four Unisys results. The database server is the benchmark bottleneck, and database server scalability determines the scalability of the configuration.

**Figure 1: SAP SD Performance and Database Server Price-Performance**



Source: Aberdeen Group, June 2001

The software cost of the database server operating system was included as part of the database server cost in those cases where the OS was not bundled into the cost of the hardware. The costs of the Oracle and SQL Server database software were not included, however. (If the database software costs were included, the analysis would further favor the Windows/SQL Server configurations.)

Figure 1 presents price-performance data — based on the costs of the database servers per SD user — alongside the absolute SAP SD performance. These results show a clear price-performance benefit for the Unisys systems running on a Wintel infrastructure. The relative price-performance advantage is roughly three times better than that of the Sun E10000, and significantly better (between 23% and 35%) than that of the IBM RS/6000 S80.

### **Aberdeen Conclusions**

These results represent a breakthrough in the performance of Windows-based systems. The price-performance advantage of the Intel architecture running Windows 2000 remains intact after three years — but, whereas the tea leaves suggested in 1998 that Windows NT did not meet high-end SAP performance requirements, the Unisys ES7000 and Unisys prowess as a benchmark gorilla now indicate otherwise. It should come as no surprise that Microsoft continually applauds the efforts of Unisys engineers in taking Windows 2000 “up the enterprise.” Microsoft executives now boast that Windows 2000 and SQL Server 2000 can meet the needs of all SAP applications. The Unisys ES7000 is the first platform to provide hard evidence that this Microsoft claim is credible.

Aberdeen observes that the combination of scalable performance and improved reliability and manageability has, for the first time, moved a Windows-based platform, specifically Unisys e-@ction servers, into the same enterprise class occupied by Unix systems. SAP and its customers implementing high-volume e-Business applications now can exploit the price-performance savings of the Wintel platform without compromising the robustness of their enterprise solutions.

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