

Scalability

Microsoft Dynamics GP

Benchmark Performance 1,000 Concurrent Users on Microsoft SQL Server 2005

White Paper

Scalability

Date: April 26, 2006



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Introduction

Growth is the goal in many organizations. Growth can come in many forms; it can be sheer increases in number of employees, customers, patients, members or constituents; it can involve launching new products, services or entering new geographies; it can be simply increasing transaction levels driven by sales or purchasing. Regardless of form, organizations need the ability to confidently manage growth. That management comes not only from an organization's people, but also from its business systems. As you will see from this white paper, Microsoft Dynamics GP 9.0 on Microsoft SQL Server 2005 has the capacity to scale with growing organizations, successfully handling massive amounts of transactions and data. Whether it's sheer transaction volume in a particular business function, size of your database or number of users and machines, Microsoft Dynamics GP can handle the peaks and valleys that come with regular business cycles as well as the long-term, ever upward path that comes with a growing organization. Now you can focus on growing, and not worry about whether or not your existing business system can keep pace with your success. This whitepaper documents the successful performance benchmark testing of Microsoft Dynamics GP 9.0 running with 1,000 constant concurrent users in heavy transaction processing and analysis activity across various functional areas of the solution. This performance benchmark demonstrates a sample customer environment demonstrating processing of more than 1.9 million business transactions (with a total of 6.31 million transaction line items) in an 8 hour work day. In addition sample customer transaction processing throughput is included from some of our customers. The combination of this information will help you assess the ability of Microsoft Dynamics GP to scale to meet your organizations needs. Should you require additional diligence regarding scalability, please contact Microsoft or your Microsoft Dynamics GP Partner.

Summary Results

Transaction processing speed and system scalability are important criteria when researching financial and business management applications. You need to know your new system will be able to easily handle existing transaction loads, with the ability to manage significant increases should your business experience exponential growth. The foundation for any business management application is the operating environment products it is designed to use. Microsoft Dynamics GP is designed for Microsoft Windows and SQL Server. These two widely used products provide high volume transaction processing at low costs as validated by Transaction Processing Performance Council's TPCC and TPC-W benchmarks. These results are proof that businesses that rely on scalable operating environments can achieve better results with business management applications based on Microsoft Windows and SQL Server like Microsoft Dynamics GP. And they can do so at a fraction of the price of comparable systems. For more information on Microsoft SQL Server Benchmark results visit <http://www.microsoft.com/sql/evaluation/compare/benchmarks.asp>. Microsoft Dynamics GP in concert with Microsoft server technologies creates a business system environment that is easy to use, lowers the overall cost of distributed computing and enables businesses to harness the power, flexibility and award-winning functionality of Microsoft Dynamics GP. Organizations can now improve their decision making, streamline business processes and strategically manage their growth because they can have confidence that their business system will grow with them. The following test results demonstrate that Microsoft Dynamics GP can handle substantial transaction volumes for large organizations. The test consisted of 1,000 physical Microsoft Dynamics GP users entering transactions and processing transactions continuously while other activities such as Payables Management Checks printed, Payroll Checks printed and Receivables Management Month End Process of Aging, Statements, and Paid Transaction Removal running simultaneously.

Transaction Type	Transactions Per Hour	Transaction Line Items Per Hour
General Ledger Transaction Entry	9,102	91,020
Receivables Cash Entry	55,357	55,357
Receivables Cash Posting	8,379	8,379
Payables Voucher Entry	25,050	25,050
Payables Voucher Posting	27,634	27,634
Sales Order Entry	57,784	288,920
Sales Order Transfer	34,078	170,390
Sales Order Posting	21,957	109,785
US Payroll Check Processing	1,000	13,000

	Per Hour Throughput	8 Hour Business Day Throughput
Business Transactions	240,341	1,922,725
Business Transaction Line Items	789,535	6,316,280

The transaction throughput documented in the table above was achieved while the Microsoft Dynamics GP system was simultaneously completing the following intensive analysis and processing functions:

- Payables Check Processing
- Payables Historical Aged Trial Balance
- Receivables Historical Aged Trial Balance
- Receivables Month End Aging
- Generation of Receivables Statements
- Receivables Month End Paid Transaction Removal
- Generation of Inventory Stock Status Report

Test Definition

To put perspective on the test itself, it is helpful to understand the following items.

- The users in these tests were not simulated users but actual Microsoft Dynamics GP clients.
- This test consisted of 1,000 physical Microsoft Dynamics GP users entering transactions and processing transactions continuously.
- Other activities were done simultaneously, such as Payables Management Checks being printed, Payroll Checks being printed, Receivables Management Month End Process of Aging, Statements, Paid Transaction Removal, and report printing of Payables Historical Aged Trial Balance, Receivables Historical Aged Trial Balance and Inventory Stock Status Report.
- Most clients had a type delay which represented clients entering information in at 90 words a minute.
- In the scenarios, all clients were continuously processing simultaneously during the test.

The table below shows the definition of the test.

Transaction Type	Transaction Line Count	Number of Clients Running Test
General Ledger Transaction Entry	10	115
Payables Voucher Entry	1	100
Receivables Cash Entry	1	105
Sales Order Entry	5	500
Sales Order Transfer	5	75
Sales Order Posting	5	75
Receivables Cash Posting	N/A	20
Payables Voucher Posting	N/A	5
Payables Historical Aged Trial Balance	N/A	1
Receivables Historical Aged Trial Balance	N/A	1
Payables check Processing	N/A	1
Receivables Aging	N/A	1
Payroll Check processing	N/A	1
Total Constant Concurrent Users		1,000

For example, there were 115 users concurrently entering in General Ledger journal entries with 10 line items in each entry.

Detailed Results

The information below outlines the benchmark tests that were performed using Microsoft Dynamics GP 9.0. This test was performed 1,000 constant concurrent users and various conditions experienced in typical Microsoft Dynamics GP implementations. All processes were running simultaneously. Overall, Microsoft Dynamics GP used 46+% of the available server CPU capacity.

Sales Order Processing Transaction Throughput

This measured the rate at which Microsoft Dynamics GP can accept transactions being entered via Sales Order Processing order entry, while simultaneously transferring orders to invoices, and posting invoices to Microsoft Dynamics GP Sales Order Processing, Receivables, and Inventory applications.

Sales Order Processing	Transactions Per Hour	Line Items Per Hour
Orders Entered	57,784	288,920
Orders Transferred	34,078	170390
Invoices Posted	21,957	109785

Receivables Cash Receipts

This measured the rate at which Microsoft Dynamics GP handles cash receipt transactions being entered while other cash receipts are posted via Receivables Management during a one hour period.

Cash Receipts	Transactions Per Hour
Receipts Entered	55,357
Receipts Posted	8,379

General Ledger Accounts

This measured the rate at which Microsoft Dynamics GP entered via General Ledger during a one hour period.

General Ledger Entries	Transactions Per Hour	Transaction Lines Per Hour
Journal Entries Entered	9,102	91,020

Payables Vouchers

This measured the rate at which Microsoft Dynamics GP handles vouchers being entered while other vouchers are posted via Payables Management during a one hour period.

Payables Vouchers	Transactions Per Hour
Vouchers Entered	25,050
Vouchers Posted	27,634

Analysis and Processing Detail

Simultaneous to the transaction throughput processing listed above, additional analysis and processing routines were being completed within the Microsoft Dynamics system with the following volumes.

Process	Details
Customer Statements Printed	154,933
Payables Vouchers Paid	2,237
Customers on Historical Aged Trial Balance	102,038
Vendors on Historical Aged Trial Balance	153,000
Employees Paid in Pay Run	5,000
Transaction Lines in Pay Run	65,000
Inventory Items on Stock Status Report	59,992

Test Starting Data

The Microsoft Dynamics GP data sets used in testing are configured to allow comparisons across different levels of transactions. In addition, prior to each test, after the data is restored statistics are updated in order to synchronize data distribution, index distribution and table statistics. This process is similar to the process that Microsoft SQL Server uses to maintain dynamic statistics on data in a production environment. The information supplied below represents key tables within the 270 GIG database.

Record Type	Starting Record Count
General Ledger Accounts	164,001
General Ledger Transactions	1,154,603
General Ledger Transaction Lines	10,296,027
General Ledger Year to Date Transactions	51,541,034
GL History	6,081,487
Inventory Items	59,992
Inventory Item Quantity	389,970
Inventory Purchase Receipts	528,980
Payables Vendors	153,000
Payables Work Transactions	520,001
Payables Open Transactions	33,433
Payables Paid Transaction History	782,889
Purchase Order Work	3
Purchasing Receipt History	214,002
Purchasing Receipt Line History	358,001
Receivables Customers	153,106
Receivables Sales Work	1,020,001
Receivables Open Transactions	683,209
Receivables Transaction History	3,770,887
Sales Transaction Work	802,140
Sales Transaction Amounts Work	4,272,835
Sales Transaction History	6,932,953
Sales Transaction Line History	33,875,654
Payroll Master	51,000
Payroll Tax Information Master	51,000
Payroll Pay Code Master	101,500
Payroll Deduction Master	252,000
Payroll State Tax Master	51,000

Test Methodology

Microsoft uses an internal testing lab to conduct software performance reviews, as well as to perform automated testing routines. This testing lab is isolated from other network traffic during the tests. Note that the client/server configurations are running the automated testing system only and do not have any other network traffic during the benchmark process. Although this would not likely be the case in an actual site, as most clients will also be running e-mail or other workplace specific applications, this kind of testing does allow for the isolation and testing of critical system components – the database server in this case. From a system perspective, this kind of testing is more stressful than would be encountered in a real customer environment.

Comparison to previous performance reports

Microsoft has published several performance reports in the past, and while we can confidently state that we have made performance advances in specific areas of the product from release to release, it must also be noted that the testing environment continuously evolves, negating any “apples to apples” comparisons. More powerful hardware, better configurations, new versions of operating system and database management software, adjustments to the starting data set and enhancements to our solutions all contribute to overall performance.

Test Lab Configurations

This report presents the results of internal testing as performed by a Microsoft Corporate Testing Lab with the following applications:

- Microsoft Dynamics GP 9.0
 - Cluster Indexes added
 - CM Journal (CM20100) on index CMJnl_CntrlYpteByLinkRecordNumber (PKCM20100)
 - Item Quantity Master (IV200102) on index IV_Item_MSTR_QTYS_Key2 (AK2IV00102)
- Microsoft SQL Server 2005 Enterprise 32-bit Edition SP1
- Microsoft Windows 2003 Enterprise x64 Edition SP1 (Server)
- Microsoft Windows XP SP2 (Client)

Testing Hardware

Server Definition – Dell Power Edge 6850

4 Dual-Core 32-bit Xeon processors at 3.0 GHz

16 GIG RAM

1 10/100/1000 NIC

4 Internal drives (18.2 GIG 15K U320) Raid 10 on a PERC4/DC

4 Emulex LP1050Ex 2Gb/s Fibre Channel HBAs

External Storage - Dell | EMC CX600 SAN

6 - Raid Groups consisting of 1 LUN each

Each RAID group consists of 14 - 36.4 GIGS 15 K/2 Gb Fibre Channel Drives

RAID level for all 6 is RAID 10

DATA 1, DATA2, DATA3, DATA4, LOGS, TEMPDB

Fan out tempdb files – 8 total, 1 for each processor

Client Definition - Dell Power Edge 850 – 10 instances of Dynamics GP running on each client

Single 3.0 GHz Dual Core

2 GIG RAM

75 GIG HD

Real Life Results

Customers

Nothing is more frustrating than asking a customer to wait because the “system is slow.” That customer can very easily go elsewhere with their business. Arguably, the most important function any business performs is that of efficiently processing customer sales. Not only is sales one of the most important barometers of how a company is performing, but a business’ ability to quickly fulfill a customer’s request allows them to improve customer loyalty and retention and grow by gaining market share over their competitors. Microsoft Dynamics GP has proven itself in both real life and computer lab tests to not only handle large sales order transaction volumes but to also handle the load comfortably when those volumes grow in a successful business.

- A leader in the computer and technology industry meets their customer demands by successfully transacting over 4,000 sales orders a day in Microsoft Dynamics GP.
- A large telecommunications company profitably manages over 500,000 customers and imports over 1,000,000 receivables transactions a month in its Microsoft Dynamics GP system.
- A successful company in the printer parts business uses Microsoft Dynamics GP to fulfill 24,000 customer sales orders each month.

Suppliers

Businesses have to rely on their suppliers. Without a dependable supply of goods and services into your business, the trickle down result is an inability to adequately satisfy your customers’ demands. It only makes sense that your loyal vendors – the ones that bend over backwards for you in a pinch AND the ones that will negotiate terms and rates with you in good faith – are the ones that have been treated fairly along the way. Easy to handle, accurate purchase orders and timely, fair payments from you create those type of relationships. Microsoft Dynamics GP gives you that kind of leverage and can do it with thousands of suppliers and transactions.

- A printing industry company efficiently manages over 5,000 purchase order transactions each month in Microsoft Dynamics GP.
- An innovator in the financial sector uses Microsoft Dynamics GP to import and processes over 100,000 payables transactions per day.

Employees

At the end of the day it's your people who make up your business. Your ability to meet their needs from a pay and benefits perspective will ultimately affect how well they treat your business partners – customers, vendors, investors and the like. The Microsoft Dynamics GP solutions productively manage a company's most valuable asset .

- Microsoft Dynamics GP helps a high volume restaurant franchisee keep their 4,000 employees satisfied handling benefits and managing over 20,000 payroll transactions per pay period.

Inventory

Your inventory gets hit from all sides. Too much on-hand can rob your profitability, and too little can send your customers into the arms of your competition. Not to mention the fact that transaction volumes in inventory can swell easily because they are affected by both sales and purchases. Combine those two elements and you have a business function that can be horribly costly if not handled correctly, or one that gives you THE competitive edge if handled well. Microsoft Dynamics GP' has proven its ability to manage huge inventory transaction volumes fast and accurately.

- A large wholesale distributor in the industrial supply industry keeps control of over 200,000 inventory items using Microsoft Dynamics GP.

General Ledger

The final test of a business management application is the ability for decision makers to keep their fingers on the pulse of their business. Profit & Loss Statements, Balance Sheets, Statements of Cash Flow and other financial statements are the crucial reports that allow executives to do just that. Your ability to "fly over" at a high level and see the landscape, as well as "dive down" into increasing levels of detail is paramount if you are going to be able to identify and act on issues. A business owner can't get from that summary and then slice the details in different ways if his business system can't handle massive amounts of transactions posted to volumes of account numbers. Microsoft Dynamics GP allows decision makers to continue to be confident in their GL data even when hundreds of thousands of accounts and transactions are involved.

- A large not-for-profit uses Microsoft Dynamics GP to navigate 500,000 GL account numbers and stay in front of business issues.

System

Using a business system for any length of time can accumulate massive amounts of data in a database. And that data can grow exponentially as a business grows. It's that very data that is critical to making timely, accurate decisions whether it's 8 minutes old, 8 months old or 8 years old. Adding all that data, or for that matter, adding additional users can't bog down your ability to process current daily transactions. Microsoft Dynamics GP efficiently scales with a successful business to handle the additional system loads put on it by growth.

- Microsoft Dynamics GP helps a jewelry industry company handle a growing user base of more than 350 concurrent users.
- A music and video products company successfully mine a valuable database of over 150 gigabytes worth of business transactions with Microsoft Dynamics GP.

Microsoft Dynamics is a line of integrated, adaptable business management solutions that enables you and your people to make business decisions with greater confidence. Microsoft Dynamics works like and with familiar Microsoft software, automating and streamlining financial, customer relationship and supply chain processes in a way that helps you drive business success.

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