

# Scalability

Microsoft Dynamics GP 10.0

Benchmark Performance:  
1,000 Concurrent Users with  
Microsoft SQL Server 2005

White Paper

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## ***Introduction***

Business growth can appear in many forms: increasing numbers of employees, customers, patients, members, or constituents; launching new products and services; entering new geographies, and more. Growth also simply can reflect increasing transaction levels driven by sales or purchasing. Regardless of form, organizations need both the right people and the right business systems if they are to manage growth with confidence. This white paper demonstrates how Microsoft Dynamics™ GP delivers a business system that can scale with growing organizations by successfully handling massive amounts of transactions and data.

Whether it's managing sheer transaction volume in a particular business function, database size, or number of users and machines, Microsoft Dynamics GP can handle the peaks and valleys of regular business cycles, as well as the long-term, upward path that reflects growth. With Microsoft Dynamics GP, you can focus on keeping pace with success, rather than worrying about the systems that make your business run.

This white paper documents performance benchmark testing for running Microsoft Dynamics GP 10.0 with 1,000 constant concurrent users, all engaged in heavy transaction processing or analysis activity across various functional areas of the solution. The performance benchmark demonstrates a sample customer environment processing more than 2.6 million business transactions (with a total of 8.3 million transaction line items) within an 8 hour work day. For organizations challenged by demanding payroll processes, this paper offers additional benchmark testing of a year-end payroll run for 30,000 employees, with Microsoft Dynamics GP completing a full year-end payroll processing and reporting scenario in 11.2 hours.

The paper also includes real-world examples of transaction processing throughput from some of our customers.

The combination of this information will help you assess how Microsoft Dynamics GP can scale to meet your organizational needs and goals. For additional information regarding scalability, please contact Microsoft or your Microsoft Dynamics GP Partner.

## ***Microsoft Dynamics GP Delivers***

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 its operating environment. Microsoft Dynamics GP is designed to work with Windows Server®, Windows® client operating systems, and Microsoft® SQL Server®. These widely used products provide high-volume transaction processing at low costs, as validated by Transaction Processing Performance Council's TPCC and TPC-W benchmarks. Testing results prove that businesses that rely on scalable operating environments can achieve better results using business management applications—in this case, Microsoft Dynamics GP—based on Windows Server and Windows client operating systems and SQL Server. And they can do so at a fraction of the price of comparable systems.

Working in concert with Microsoft server technologies, Microsoft Dynamics GP delivers 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 functionality of an award-winning Microsoft Dynamics GP business management solution. Organizations can improve their decision making, streamline business processes, and strategically manage their growth with the assurance 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.

For more information on SQL Server Benchmark results visit <http://www.microsoft.com/sql/prodinfo/compare/benchmarks.mspx>.

### Summary Results

Benchmark performance testing consisted of 1,000 physical Microsoft Dynamics GP users entering transactions and processing transactions continuously, with other activities such as Payables Management check printing, Payroll check printing and Receivables Management month-end processes of aging, statements, and Paid Transaction Removal running simultaneously.

The tables below summarize test results.

Transaction Type	Transactions Per Hour	Transaction Line Items Per Hour
General Ledger Transaction Entry	10,769	107,690
Receivables Cash Entry	55,026	55,026
Receivables Cash Posting	19,478	19,478
Payables Voucher Entry	31,337	31,337
Payables Voucher Posting	66,131	66,131
Purchase Order Entry	3,529	17,645
Purchase Orders Received	3,098	15,490
Purchase Orders Posted	12,492	62,460
Sales Order Entry	37,589	187,945
Sales Order Transfer	34,084	170,420
Sales Order Posting	49,212	246,020
US Payroll Check Processing	5,000	60,000

Transactions and Transaction Line Items	Per Hour Throughput	8 Hour Business Day Throughput
Business Transactions	327,745	2,621,960
Business Transaction Line Items	1,039,642	8,317,136

## Testing Definition

The following items will help put the tests into perspective:

- The users in these tests were not simulated users but actual Microsoft Dynamics GP clients.
- The tests were based on 1,000 physical Microsoft Dynamics GP users entering and processing transactions continuously. For example, there were 115 users concurrently entering General Ledger journal entries with 10 line items in each entry.
- The transaction throughput documented in the summary results was achieved while the Microsoft Dynamics GP system was simultaneously completing intensive analysis and processing functions, including:
  - 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
- Most clients had a type delay, which represented clients entering information at 90 words per minute.
- In the scenarios, all clients were continuously processing simultaneously during the test.

The table below outlines the testing definition.

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
Purchase Order Entry	5	50
Purchase Order Received	5	25
Purchase Order Posted	5	25
Sales Order Entry	5	400
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 Month End	N/A	1
Payroll Check processing	N/A	1
<b>Total Constant Concurrent Users</b>		<b>1,000</b>

## Detailed Results

The information below outlines the benchmark tests that were performed using Microsoft Dynamics GP 10.0. As noted earlier, the tests were based on 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 55+% of the available server CPU capacity, indicating that additional hardware would be optimal for large organizations running these scenarios.

### Purchase Order Processing Transaction Throughput

This test measured the rate at which Microsoft Dynamics GP accepts Purchase Order Processing transaction entries, while simultaneously receiving and posting orders to Microsoft Dynamics GP Purchase Order Processing, Payables, and Inventory modules.

Purchase Order Processing	Transactions Per Hour	Line Items Per Hour
Orders Entered	3,529	17,645
Orders Received	3,098	15,490
Orders Posted	12,492	62,460

### Sales Order Processing Transaction Throughput

This test measured the rate at which Microsoft Dynamics GP accepts Sales Order Processing transaction entries, while simultaneously transferring orders to invoices and posting invoices to Microsoft Dynamics GP Sales Order Processing, Receivables, and Inventory modules.

Sales Order Processing	Transactions Per Hour	Line Items Per Hour
Orders Entered	37,589	187,945
Orders Transferred	34,084	170,420
Invoices Posted	49,212	246,060

### Receivables Cash Receipts

This test measured the rate at which Microsoft Dynamics GP accepts cash receipt transaction entries while other cash receipts are posted by Microsoft Dynamics GP Receivables Management during a one-hour period.

Cash Receipts	Transactions Per Hour
Receipts Entered	55,026
Receipts Posted	19,478

## General Ledger Accounts

This test measured the rate at which Microsoft Dynamics GP accepts General Ledger transaction entries during a one-hour period.

General Ledger Entries	Transactions Per Hour	Transaction Lines Per Hour
Journal Entries Entered	10,769	107,690

## Payables Vouchers

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

Payables Vouchers	Transactions Per Hour
Vouchers Entered	31,337
Vouchers Posted	66,131

## Analysis and Processing Detail

During testing, analysis and processing routines also were being completed within the Microsoft Dynamics system. The table below outlines routines and associated 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 SQL Server uses to maintain dynamic statistics on data in a production environment.

The table below illustrates key record types within the 290 GB database.

<b>Record Type</b>	<b>Starting Record Count</b>
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

## UPR Payroll Run for 30,000 Employees

At the end of the 1,000 user benchmark testing described in this paper, we also conducted a test that measured payroll processing performance for exceptionally heavy loads—in this case, a pay run for 30,000 employees. This test used the same 290 GB dataset that served the 1,000 user test. Because the data set contains a year’s worth of pay runs, we executed the final, 26<sup>th</sup> pay run for the year. The test spanned both processing and reporting scenarios for executing year-end payroll.

UPR checks processing consisted of building, calculating, printing, and posting for checks. The test also included running month-end, quarter-end, and year-end reports.

As noted above, 30,000 employees were paid; each employee was paid for 72 working hours, plus 8 holiday hours per pay period. The results shown below illustrate that Microsoft Dynamics GP, working in concert with SQL Server, Windows Server, and Windows client operating systems, can efficiently complete a full payroll scenario for a large employee base.

### Summary Results: UPR Payroll Run for 30,000 Employees

The table below summarizes results for the test.

Transaction Type	Total Result	Minutes/Hours
<b>UPR – U.S. Payroll</b>		
Build, Calculate, Print, Post	7.489	Hours
Month-End Reporting	2.821	Hours
Year-End Reporting	51.324	Minutes
<b>Full Scenario: Checks Processing and Reporting</b>	11.239	Hours

## Detailed Results: UPR Payroll Run for 30,000 Employees

The table below shows detailed results for the test.

Transaction Type	Result	Minutes/Hours
<b>UPR – U.S. Payroll</b>		
<b>Payroll Checks Processing</b>		
Build Checks	0.925	Hours
Calculate Checks	1.881	Hours
Print Checks	1.359	Hours
Printing Reports and Posting	4.683	Hours
<b>Total Build, Calculate, Print, Post</b>	<b>7.489</b>	<b>Hours</b>
<b>Month End Reporting</b>		
Payroll Summary	0.505	Minutes
Pay Code Summary	0.034	Minutes
Department Wage Summary	0.027	Minutes
Position Summary	0.031	Minutes
Deduction Summary	0.042	Minutes
Benefit Summary	0.041	Minutes
State Tax Summary	0.027	Minutes
Local Tax Summary	0.009	Minutes
FUTA Report	13.955	Minutes
SUTA Report	2.576	Hours
Workers Compensation Report	0.059	Minutes
<b>Total Month End Reporting</b>	<b>2.821</b>	<b>Hours</b>
<b>Quarter-End Reporting</b>		
<b>4th Quarter: October-December</b>	<b>4.412</b>	<b>Minutes</b>
<b>Year-End Reporting</b>		
Year-End Close	31.863	Minutes
Year-End Report	7.591	Minutes
Year-End Print W2's	11.870	Minutes
<b>Total Year End Reporting</b>	<b>51.324</b>	<b>Minutes</b>
<b>Full Scenario</b>		
<b>Checks Processing and Reporting</b>	<b>11.239</b>	<b>Hours</b>

## ***Test Methodology***

Microsoft uses an internal testing lab to conduct software performance reviews and 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—in this case, the database server. From a system perspective, this kind of testing stresses the system more than a real-world 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 10.0
- Microsoft® SQL Server® 2005 Enterprise 64-bit Edition SP2
- Windows Server® 2003 Enterprise x64 Edition SP1 (Server)
- Windows® XP SP2 (Client)

## **Testing Hardware**

Server Definition – Dell Power Edge 6850

- 4 Dual-Core 64-bit Xeon processors at 3.40 GHz
- 16MB L3 Cache
- 16 GB RAM
- 1 10/100/1000 NIC
- 4 Internal drives (18.2 GB 15K U320) Raid 10 on a PERC4/DC
- 4 Emulex LP1050Ex HBAs

External Storage - Dell | EMC CX600 SAN

- 6 Raid Groups consisting of 1 LUN each
  - Each Raid group consists of 14 - 36.4 GB 15 K/ 2 GB Fiber Channel Drives
  - RAID level for all 6 groups is RAID 10
  - DATA 1, DATA2, DATA3, DATA4, LOGS, TEMPDB
    - Fan out tempdb files – 8 total, 1 for each processor
- 1 Raid Group consisting of 1 LUN
  - RAID group consists of 16 – 73 GB 10 K/ 2 GB Fibre Channel

- RAID level is RAID 5
- ALL BACKUPS

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

- Single 3.0 GHz Dual Core
- 2 GB RAM
- 75 BG HD

## **Real-Life Results**

A leading solution for businesses across a wide range of industries, Microsoft Dynamics GP offers proven capabilities that enable companies to meet customer needs, build strong supplier relationships, improve employee satisfaction, and efficiently handle business processes and system requirements.

### **Meeting Customer Needs**

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. The ability to process customer sales efficiently can make or break a business. Sales serve as one of the key barometers of performance. Equally important, the ability to quickly fulfill a customer’s request allows companies to improve customer loyalty and retention and grow by gaining market share over their competitors. In both the real world and computer lab tests, Microsoft Dynamics GP has proven its ability not only to handle large sales order transaction volumes, but also to 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 uses Microsoft Dynamics GP to profitably manage over 500,000 customers and import over 1,000,000 receivables transactions a month.
- A successful printer parts business uses Microsoft Dynamics GP to fulfill 24,000 customer sales orders each month.

### **Working with Suppliers**

Businesses have to rely on their suppliers. Without a dependable supply of goods and services, the trickle-down result is an inability to meet customer demand. 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 vendors you’ve treated well along the way. Easy-to-handle, accurate purchase orders and timely, fair payments create those lasting relationships. Microsoft Dynamics GP gives you that kind of leverage—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.

### **Ensuring Employee Satisfaction**

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. Microsoft Dynamics GP equips you to manage your most valuable asset—your employees—more effectively and increase their satisfaction.

- Microsoft Dynamics GP helps a high volume restaurant franchisee keep their 4,000 employees satisfied by enabling the company to handle benefits and manage more than 20,000 payroll transactions per pay period.

## Managing Inventory Effectively

Inventory management is a complex balancing act. Too much on-hand inventory inflates overhead and drains profitability, while too many out-of-stocks can send your customers into the arms of your competitors. Equally important, inventory transaction volumes 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 ability to manage huge inventory transaction volumes quickly and accurately.

- A large wholesale distributor in the industrial supply industry uses Microsoft Dynamics GP to maintain control over more than 200,000 inventory items.

## Utilizing General Ledger Capabilities

The final test of a business management application is whether it enables decision makers to keep their fingers on the pulse of their business, using Profit & Loss Statements, Balance Sheets, Statements of Cash Flow and other financial statements. To identify and act on issues, decision makers need the flexibility to “fly over” at a high level and see the landscape, as well as “dive down” into increasing levels of detail. 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 gives decision makers confidence that General Ledger data is accurate and current, even when hundreds of thousands of accounts and transactions are involved.

- A large non-profit organization uses Microsoft Dynamics GP to navigate 500,000 General Ledger account numbers and work proactively with business issues.

## Managing System Loads

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. Whether the data is 8 minutes old, 8 months old or 8 years old, it plays a critical role in making smart, timely business decisions. Increasing data volumes—not to mention additional users—can’t bog down your ability to process current daily transactions. Microsoft Dynamics GP scales efficiently to handle additional system loads that accompany business success and growth.

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

## ***About Microsoft Dynamics***

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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