



# PTC Windchill 9 server sizing on IBM servers

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## Abstract

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*This white paper is intended for IBM personnel, independent solution vendors (ISVs), Business Partners and customers who need to review a quick guide to understand the sizing and scalability benchmark for Windchill 9, which is enabled by IBM Power Systems servers. This white paper contains system-configuration information and test results to help people decide the number of users with different types and tasks that should be selected on Power Systems. Two IBM Power 570 (4.7 GHz) servers and 1000 licensed simulated users from PTC were used to perform the benchmark tests. The results indicate that the following observations:*

- *All of the available 1000 product data management (PDM) users can log on to the IBM Power 570 server at the same period of time and complete their tasks successfully.*
- *In addition, up to 40 computer-aided design (CAD) users can log on to the IBM Power 570 server and complete their tasks smoothly.*
- *Furthermore, after some analysis of the customer workload transaction by PTC, when all the benchmark tests were done, a factor of seven was applied to reflect the typical customer CAD usage that results from the heavy PTC CAD user-test script. Based on that information, a total of 280 CAD users should log on to the Power 570 server simultaneously and finish their tasks successfully.*

## Introduction

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This white paper describes the use of the IBM® Power™ Systems servers to enable and support PTC Windchill 9 to perform sizing and scalability benchmarks for multitype users and tasks. The benchmark tests were conducted for four weeks (in March and April 2008) at the IBM Innovation Center for Business Partners in Waltham, Massachusetts. This white paper is intended to provide general information regarding the number of various types of users who can log on to Power Systems servers simultaneously and who are able to complete different tasks successfully. In addition, by reading this white paper, IBM and PTC engineers should have a better understanding of Power Systems that use IBM POWER6™ processor technology and Windchill 9 server with product data management (PDM) Link and Project Link scalability benchmark tests.

This white paper does not describe the specific steps for installing the PTC Windchill applications. For installation details, refer to the step-by-step PTC Windchill installation documents that are provided by the IBM Systems and Technology Group Business Strategy and Enablement product lifecycle management (PLM) team.

## IBM Power 570 overview

Two IBM Power 570 servers were used for the PTC sizing and scalability benchmark tests. The IBM Power 570 was the first IBM server to feature the POWER6 processor, which is the new generation of processors that are based on the IBM PowerPC® architecture. The POWER6 processor has the fastest-ever IBM Power Architecture™ technology, and scalability is a key design feature for it. The POWER6 processor also features high memory bandwidth and is well suited to memory-intensive applications. Furthermore, the POWER6 processor has several unique features:

- Lower power consumption.
- Higher clock frequency. The IBM Power 570 used in this paper has a frequency of 4.7GHz and runs at approximately twice the frequency than POWER5. The POWER6 instruction pipeline was designed to maximize performance scalability at high processor frequency.
- The enhanced simultaneous multithreading (SMT) implementation on POWER6 can run two task threads simultaneously. It allows dispatching from two threads instead of one, with higher cache associability, therefore, improving the performance compared to POWER5.

## System configuration

Two sets of components are included in the system configuration: hardware and software (see Figure 1 and Figure 2).

### Hardware components

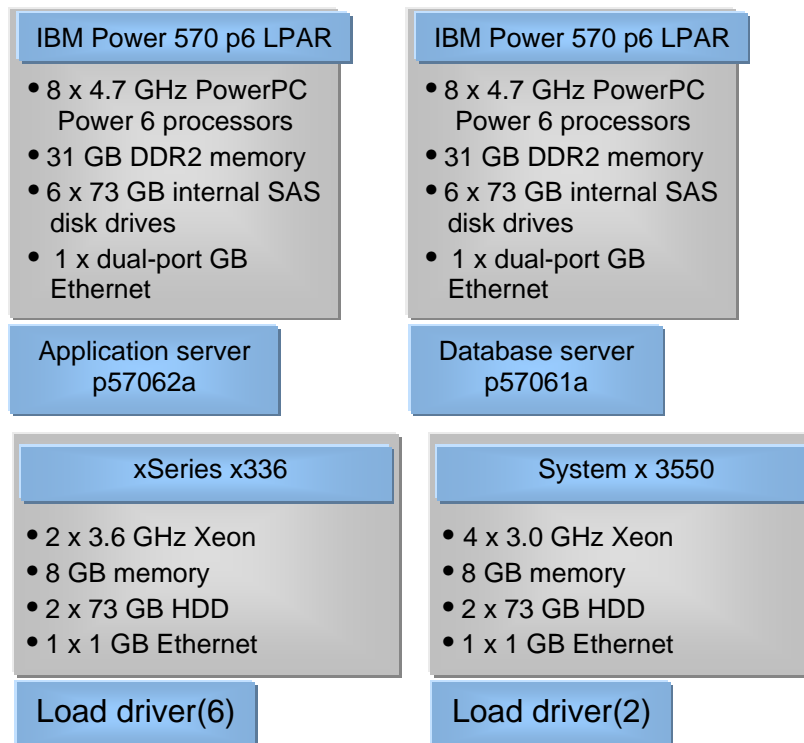
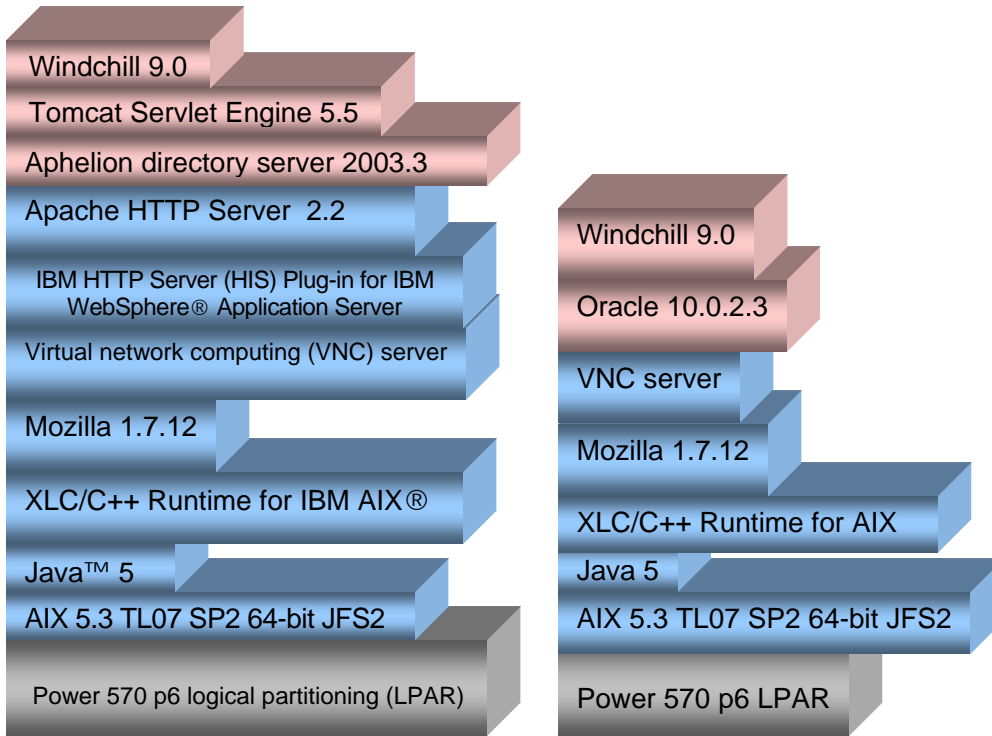


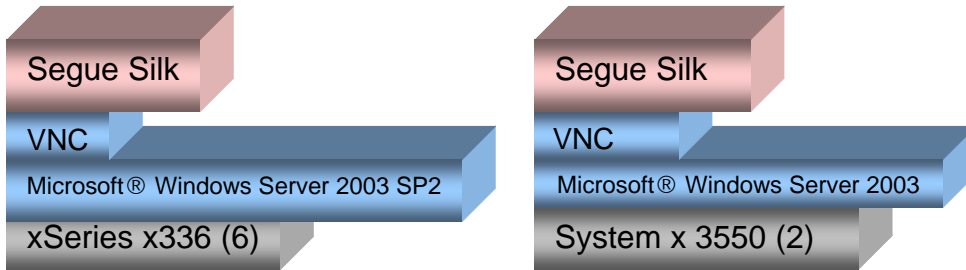
Figure 1. Hardware components for PTC Windchill 9 sizing benchmark tests

## Software components



Application server

Database server



Load injector

Load injector

■ IBM to provide and install software  
■ PTC to configure for application

■ IBM to set up hardware  
 and remote network

■ PTC to install and configure

Figure 2. Software components for PTC Windchill 9 sizing benchmark tests

**Note:** You should install and verify Windchill 9.0 ProjectLink and PDMLink products in the environment shown in Figure 2.



## User and test-case descriptions

This section explains the user and test case details.

### User description

Two simulated user profiles were used in the PTC Windchill 9 sizing and scalability benchmark tests: PDM and CAD users.

- **PDM users:** Users who create and modify business information that is stored in the system. They might be engineers or office personnel who use a variety of systems to create and modify business objects. Here, the business objects most often include documents, parts and changes. These users typically search the database or scan folders for business objects. Some of them might check out an object for modification or retrieve it to initiate an analysis application on the retrieved dataset; others will create, analyze and approve change objects. PDM users often remain in the application with no interaction with the system for long periods of time — typically 30-minute intervals between interactions.
- **CAD users:** CAD users simulate Pro/Engineer (Pro/E) load on the server. These users create, add and delete workspace using Simple Object Access Protocol (SOAP) calls, and also simulate the following Pro/E related operations by using both Remote Method Invocation (RMI) and SOAP calls. The operations create new workspace, download assembly, check out and check in assembly for a repeated number of times, check out assembly, check in assembly, undo check out, copy-as and rename assembly. RMI and SOAP transactions create workspaces.

### Test-case description

The test cases for the PTC Windchill 9 sizing and scalability benchmark were built on the gradually increased number of users who were selected from the PDM and CAD user groups. The goal was to determine the maximum number of users that can log on to the System p servers in the same period of time and be able to complete the tasks successfully. There were a total of 1000 available, licensed simulated users for testing, which was the maximum number of simulated users that PTC could provide because of the license limitation. Some test-case examples can be found in Table 1:

Test cases	40 users	230 users	315 users	620 users	1000 users
PDM users	0	200	300	600	1000
CAD users	40	30	15	20	0

Table 1. Test case examples with mixed user populations.



## Results

To determine the maximum number of users who can perform on the Power 570 server for the Windchill 9 sizing and scalability benchmark, many tests were conducted. First, there was a single-user test to make sure that the whole system could run all defined transactions successfully. When that test completed smoothly, more users were added gradually to the different test cases until the maximum of 1000 PDM users was reached and their tasks were carried out on the Power 570 server successfully. Later, a maximum of 40 CAD users were also identified to be able to perform on the Power 570 successfully. Furthermore, after all the benchmark tests were done, PTC went back to examining customer-workload transactions and determined that the PTC CAD user-test script was too heavy. Thus, a factor of seven needed to be applied to reflect the typical customer CAD usage. Based on that information, a total of 280 CAD users can log on to the Power 570 server simultaneously and finish their tasks successfully.

All of the tests conducted accurately simulated a production workload, with the set of transactions to be run and the frequency (probability) of each transaction in a given period of time. Because the goal was to reach the maximum number of users, the test results recorded here show most of the tests that involved a large number of users. For example, Table 2 shows the completed test results for PDM users from 600 to 1000 users:

Test Cases	Number of users	Cores used	User core	Memory (GB)	Results Y=pass N=not pass
Application node (p57062a, p6 4.7 GHz) PDM users	1000	8	125.0	32	Y
	750	6	125.0	24	Y
	900	6	150.0	24	Y
	1000	6	166.7	24	Y
	600	4	150.0	16	Y
Database node (p57061a, p6 4.7 GHz) PDM users	1000	8	125.0	32	Y
	750	3	250.0	16	Y
	900	3	300.0	16	Y
	600	2	300.0	8	Y

Table 2. Completed test results for PDM users from 600 to 1000



Additionally, the test results shown in Table 3 indicated that the 40-CAD-user was the maximum number of users that could be using the IBM Power 570 server simultaneously:

Test cases	Number of users	Cores used	User core	Memory (GB)	Results Y=pass N=not pass
Application node (p57062a, p6 4.7 GHz) CAD users	40	8	5.0	32	Y
	30	6	5.0	24	Y
	36	6	6.0	24	Y
	20	4	5.0	16	Y
	24	4	6.0	16	Y
	28	4	7.0	16	Y
DB node (p57061a, p6 4.7 GHz) CAD users	40	8	5.0	32	Y
	30	3	10.0	16	Y
	36	3	12.0	16	Y
	40	3	13.3	16	Y
	24	2	12.0	8	Y
	20	2	10.0	8	Y
	28	2	14.0	8	Y

Table 3. Completed test results for CAD users from 20 to 40

Furthermore, Table 4 shows that a total of 280 CAD users should log on to the IBM Power 570 server simultaneously and complete their tasks successfully:

Test Cases	Number of users	Cores used	User core	Memory (GB)
Application node (p57062a, p6 4.7 GHz) CAD users	280	8	35	32
	210	6	35	24
	252	6	42	24
	140	4	35	16
	168	4	42	16
	196	4	49	16
DB node (p57061a, p6 4.7 GHz) CAD users	280	8	35	32
	210	3	70	16
	252	3	84	16
	280	3	93	16
	168	2	84	8
	140	2	70	8
	196	2	98	8

Table 4. Completed test results for CAD users from 140 to 280





## Summary

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The IBM Power Systems server provides a robust, flexible solution for PTC Windchill 9 sizing and scalability benchmark tests in terms of greater reliability and performance. This white paper has shown that 1000 simulated PDM users and 40 resource-intensive CAD users were able to run on IBM Power 570 servers simultaneously and complete the tasks successfully. Furthermore, after a factor of seven was applied to reflect the typical customer CAD usage, a total of 280 CAD users should be able to log on to the IBM Power 570 server simultaneously and finish their tasks successfully. A complete enterprise process integration solution based on the PTC Windchill application, enabled by IBM Power systems, can be offered, delivered and supported through the joint comprehensive-services capabilities of IBM and PTC.

## Disclaimer

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The information in this white paper has been created in a collaborative effort between the PTC and IBM technical personnel who are knowledgeable in the application and its use on IBM Power 570 servers. The information contained herein represents recommended general guidelines for use in configuring IBM Power 570 servers for this particular usage, based upon IBM testing and validation of combined IBM and PTC best practices. Updates to this white paper are expected to be ongoing, as changes in software, hardware and operating systems are continuously expected and will alter the outcome of the documented configuration recommendations, components, processes and results.



## Resources

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These Web sites provide useful references to supplement the information contained in this document:

- IBM System p and AIX Information Center  
<http://publib.boulder.ibm.com/eserver>
- IBM Systems p on IBM PartnerWorld®  
[ibm.com/partnerworld/systems/p](http://ibm.com/partnerworld/systems/p)
- IBM Publications Center  
<http://www.elink.ibm.com/publications/servlet/pbi.wss?CTY=US>
- IBM Redbooks®  
[www.redbooks.ibm.com](http://www.redbooks.ibm.com)
- IBM WebSphere  
[ibm.com/software/webservers/appserv/was](http://ibm.com/software/webservers/appserv/was)
- WebSphere 6.1 Installation Guide for PDM Applications  
[www-304.ibm.com/jct09002c/partnerworld/wps/servlet/ContentHandler/whitepaper/websphere/v6r1/pdm/install](http://www-304.ibm.com/jct09002c/partnerworld/wps/servlet/ContentHandler/whitepaper/websphere/v6r1/pdm/install)
- Oracle Database 10g Release 2 (10.2.0.1.0) Installation Guide for PDM Applications  
[http://w3-1.ibm.com/sales/systems/myportal/\\_s.155/254?navID=f220&geolD=All&prodID=Deep%20Computing&docID=UGSTCEducation](http://w3-1.ibm.com/sales/systems/myportal/_s.155/254?navID=f220&geolD=All&prodID=Deep%20Computing&docID=UGSTCEducation)
- PTC Windchill 9 AIX Installation Guide  
[www-304.ibm.com/jct09002c/partnerworld/wps/servlet/ContentHandler/guide/aix/ptc\\_windchill/install](http://www-304.ibm.com/jct09002c/partnerworld/wps/servlet/ContentHandler/guide/aix/ptc_windchill/install)
- PTC Windchill  
[www.ptc.com/support/index.htm?dd=Support](http://www.ptc.com/support/index.htm?dd=Support)
- Oracle  
[www.oracle.com/index.html](http://www.oracle.com/index.html)



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