

Revit® Platform 2009

Computing Infrastructure Recommendations

The Revit platform's performance depends on the hardware environment provided for the software. The Revit platform team has assembled this collection of hardware requirements as researched by both internal development and our community of dedicated customers.

Many people on the Revit platform team from Quality Assurance, Development, Consulting and Product Management contributed to this document, but a number of recommendations arose from the community of Revit-based application users, who generously contributed their time and expertise to their peers in a number of forums, and urged Autodesk to help share their knowledge with an even wider audience.

As always, our thanks go to our customers, who are part of the team helping to improve the Revit platform with every release through their insightful comments and suggestions.

The Revit Platform Development Team

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Hardware Requirements for the Revit 32-bit platform

System Requirements

Description	Requirement
Operating System	<p>Microsoft® Windows® XP® SP1 or SP2</p> <ul style="list-style-type: none"> ▪ Home ▪ Professional ▪ Tablet PC <p>Microsoft Windows XP Professional x64 Edition</p> <p>Microsoft® Windows® Vista® 32 bit</p> <ul style="list-style-type: none"> ▪ Business ▪ Home Premium ▪ Ultimate <p>Microsoft Windows Vista 64 bit</p> <ul style="list-style-type: none"> ▪ Business ▪ Home Premium ▪ Ultimate
Browser	Microsoft Internet Explorer® 6.0 SP1 (or later)
CPU type	Intel® Pentium® 4 1.4 GHz or equivalent AMD® processor
Memory	*3 GB RAM (1 GB RAM if no rendering required)
Video Display	1280 x 1024 monitor and display adapter capable of 24-bit color
Hard Disk	3 GB free disk space
Pointing Device	MS-Mouse compliant
Media	Download or Installation from DVD
Connectivity	Internet connection for license registration

* For more information, see “Memory” section.

System Recommendations 32-bit Platform

Description	Requirement
Operating system	Microsoft Windows XP Professional SP2 (or later) Microsoft Windows XP Professional x64 Edition
Browser	Microsoft Internet Explorer 6.0 SP1 (or later)
CPU type	Intel™ Core 2 Duo 2.40GHz or equivalent AMD processor
Memory	*4 GB RAM
Video Display	Dedicated video card with hardware support for OpenGL spec 1.3 or later and support for DirectX 9 or later.
Hard Disk	5 GB free disk space
Pointing Device	Two-button mouse with scroll wheel

* For more information, see “Memory” section.

Hardware Requirements for the Revit 64-bit platform

System Requirements

Description	Requirement
Operating System	Microsoft® Windows® XP Professional x64 Edition Microsoft Windows Vista® 64 bit <ul style="list-style-type: none"> ▪ Business ▪ Home Premium ▪ Ultimate
Browser	Microsoft® Internet Explorer® 6.0 SP1 (or later)
CPU type	Intel® Pentium® 4 1.4 GHz or equivalent AMD processor
Memory	3 GB RAM
Video Display	1280 x 1024 monitor and display adapter capable of 24-bit color
Hard Disk	3 GB free disk space
Pointing Device	Microsoft-mouse compliant

Description	Requirement
Media	Download
Connectivity	Internet connection for license registration

System Recommendations

Description	Recommendation
Operating system	Microsoft Windows XP Professional x64 Edition
Browser	Microsoft Internet Explorer 6.0 SP1 (or later)
CPU type	Intel Core [®] 2 Duo 2.40GHz or equivalent AMD processor
Memory	8 GB RAM (or more)
Video Display	Dedicated video card with hardware support for OpenGL specification 1.3 or later, and support for Microsoft [®] DirectX [®] 9 or later.
Hard Disk	5 GB free disk space
Pointing Device	Two-button mouse with scroll wheel

Detailed Hardware Recommendations

Central Processing Unit (CPU)

The Revit platform is a computationally intensive application, and will benefit from a high-performance CPU.

- Most users select Pentium® 4 3.4 GHz processors or faster.
- Some customers have gained performance benefits through moderate overclocking of the CPU. Customers should consult with manufacturers to determine safe values of processor overclocking.
- Centrino®/Pentium-M®/Core Duo® Intel processors for laptops work well with the Revit platform, and are recommended for laptops given their higher efficiency and reduced heat output. Multiply a Centrino/Pentium-M's processor speed by 1.6 to find its approximately equivalent Pentium 4 processor speed.

Multiple-Core / Multiple Processors

- Although the Revit platform is generally not optimized for multi-threading, multiple-core processors reduce cycle use by other applications running concurrently. Some reports show as much as a 20% increase in Revit platform performance in a multi-core or multiple processor environment.
- The Revit platform's rendering function is optimized to use up to four processors. The Revit platform will share processing time with one of these four rendering processors, so there is no exclusive gain for the Revit platform in making available more than four processors. Additional processors may be desired if other computationally-intensive applications need to run while the Revit platform is rendering.

CPU Performance

A variety of benchmarks are available to compare CPU performance. The following links are provided as a service to customers who may wish do further research. Autodesk makes no warranties about the accuracy or veracity of this data:

<http://www.tomshardware.com/charts/cpu-charts-2007/3d-studio-max-9,369.html>

<http://www.cpubenchmark.net/>

<http://www.spec.org/benchmarks.html>

L2 Cache

Because of their substantial performance benefits, the Revit platform team strongly recommends CPUs which include an L2 cache. Larger L2 caches of 2MB and beyond can provide performance benefits for computationally-intensive operations such as model regeneration.

Processors with a smaller or no L2 cache, such as the Celeron® and Sempron® models are not recommended for use with the Revit platform.

Hard Drive

Speed

Workstation hard drive speed affects Revit platform performance during model load, local model save, and hard disk swapping managed by the Microsoft Windows operating system.

If higher performance is desired during these operations, a faster hard drive may provide some benefit; however the Revit platform team considers this workstation improvement of lower priority when compared with performance enhancements related to CPU speed and available RAM.

Type

SCSI or SATA drives are optional for the Revit platform.

Configuration

For the Windows operating system swap file, it is recommended that you set both the minimum and maximum settings to the same value, which should be at least twice the value of your installed RAM. This approach will prevent Windows operating system from changing the size of the swap file while you are working.

Defragmentation

It is recommended that you defragment local PCs and servers periodically. Highly fragmented drives may noticeably slow PC performance.

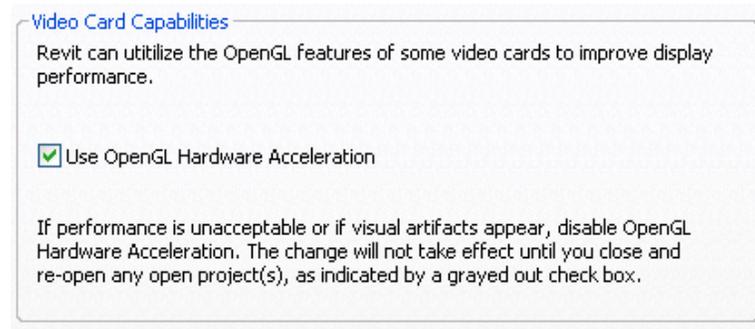
Video Cards

- The Revit platform team strongly recommends dedicated video cards supporting OpenGL specification 1.3 or later and support for DirectX 9 or later.
- Consider video cards designed to support CAD applications.
- Integrated video support should be avoided because of the use such schemes make use of machine RAM rather than on-card memory.
- Relatively inexpensive video cards may perform as well or better than more expensive cards.
- Revit platform rendering does not benefit from the video card graphics processing unit (GPU), nor does it not benefit from a large amount of video RAM. 128MB of video memory should be more than sufficient.

Hardware Acceleration

To take full advantage of OpenGL hardware acceleration, please follow these steps:

1. In the Settings menu, select “Options...”
2. Select the “Graphics” tab.
3. Check the “Use OpenGL Hardware Acceleration” box, illustrated below.
4. Close and restart the Revit-based application.



Memory

Installed RAM

- Minimum RAM is 1 GB but 4GB is highly recommended. Larger, more complex models will make use of more RAM. See “Operating Systems (OS)” below for configuration notes.
- For 64-bit Revit products, 8GB or more of RAM is recommended.
- The quantity of RAM available to the Revit platform is partially dependent on the Windows® operating system environment. See “Operating Systems (OS)” below.
- The amount of local machine RAM required is approximately 20 times the size of your compacted central project file.
- Revit platform rendering now operates in a separate process, and could benefit from memory available beyond the limits accessible by the Revit-based application itself.
- Memory specifications vary, but higher speed dual channel RAM such as the 1066 type may yield some performance benefits.

Management

Revit-based applications maintain model data in memory and hard disk caches to increase performance against repeated data access, but as a consequence of extended model manipulation Revit platform performance may benefit from an application restart once or twice a day, and especially before triggering the following memory-intensive tasks:

- Printing
- Rendering
- Exporting
- Upgrading models to the current the Revit-based application version

In addition, before performing any of the operations listed above, performance can be increased by reducing memory use through the following tactics:

- Close other applications
- Turn off shadows for all printed views if not absolutely necessary.

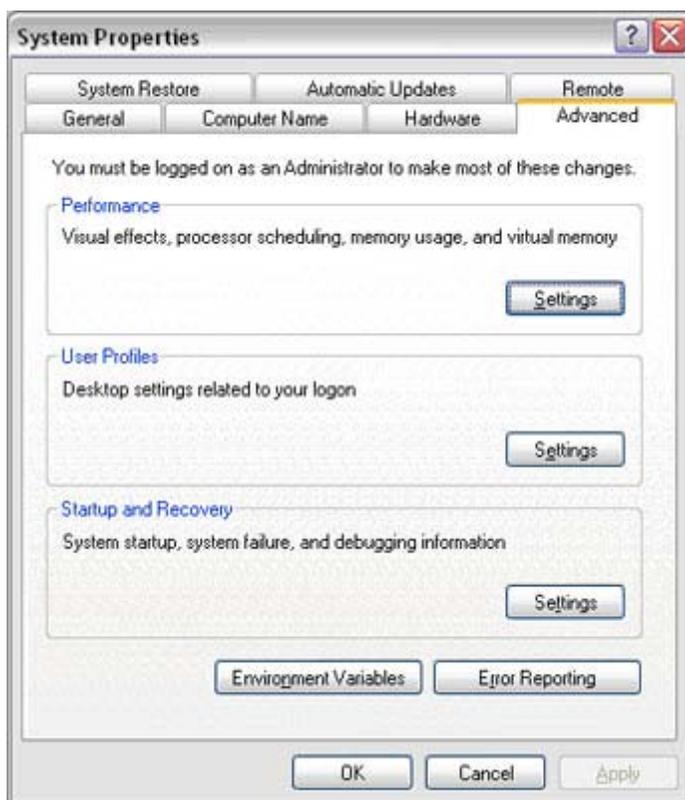
- Detach local copies from central before printing and exporting to limit network resources and reduce project chatter between local and central files. Use this tactic with caution since changes subsequent to detachment cannot be saved to the central file.

Paging File Optimization

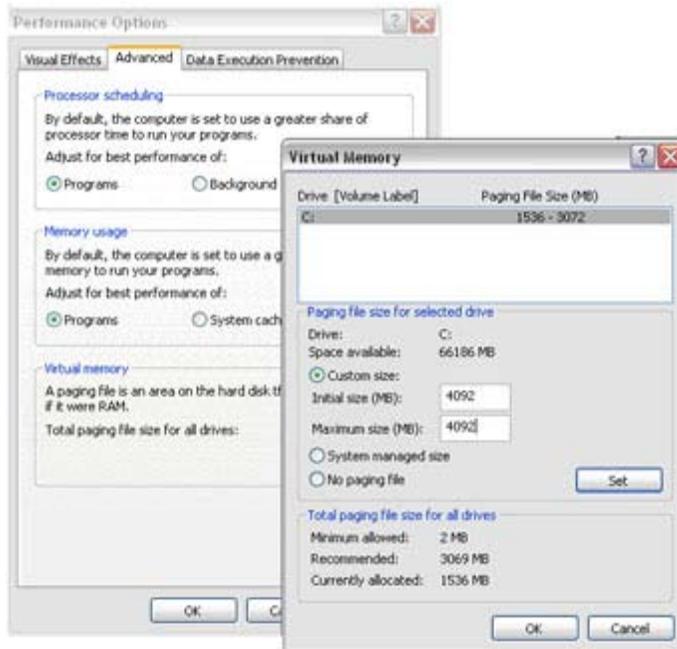
Verify that the paging file size is optimized for your system. The paging file should be at least the size recommended for Windows and at most twice the amount of installed RAM. Larger page files may provide more memory to the Revit platform, but performance could degrade noticeably with expanded page files.

Follow these steps:

1. On the Start menu (Windows), click Settings > Control Panel.
2. In Control Panel, double-click System.
3. In the System Properties dialog box, click the Advanced tab.

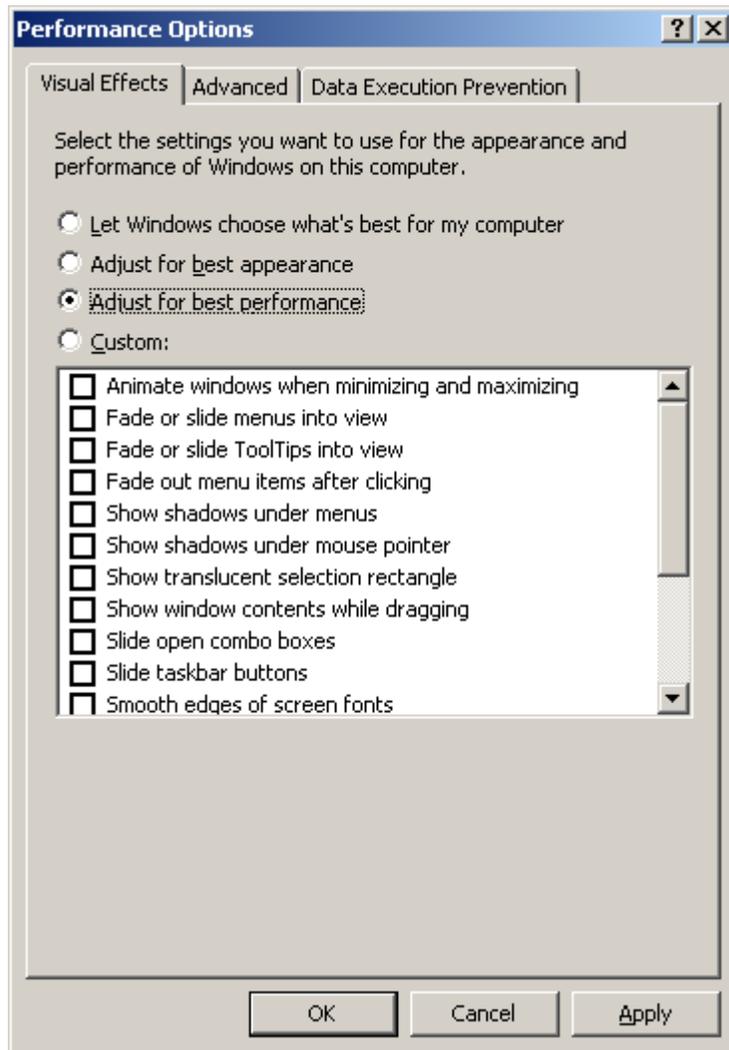


4. Under Performance, click Settings.
5. In the Performance Options dialog box, click the Advanced tab.
6. On the Advanced tab, under Virtual Memory, click Change.
7. In the Virtual Memory dialog box, change the Initial and Max values to 4092 (2 * 2GB) for a 2GB machine.



8. Click Set.
9. Click OK to close the Virtual Memory dialog box.
10. Click Apply

11. Click the Visual Effects tab



12. Select Adjust for Best Performance

13. Click Apply

14. Click OK to close each dialog box

See also the Autodesk Technical Document on the Revit platform and Virtual Memory:

<http://usa.autodesk.com/adsk/servlet/ps/item?siteID=123112&id=8018971&linkID=9243099>

Operating Systems (OS)

32-Bit Windows Operating Systems

- **Windows XP** only makes 2GB of system memory available to applications unless the **/3GB** switch is enabled in the **boot.ini** file. For complete information on enabling access for Revit-based applications to 3GB of memory, please see the Autodesk technical document:

<http://usa.autodesk.com/getdoc/id=TS1060353>

And the Microsoft technical document:

<http://www.microsoft.com/whdc/system/platform/server/PAE/PAEmem.msp>

- **Windows Vista** similarly limits applications to 2GB of memory use, unless the **/increaseuserva 3072** switch is enabled. Windows Vista no longer employs the boot.ini file. Instead, the command line utility **bcdedit** must be used. Please see the Microsoft technical document:

<http://msdn2.microsoft.com/en-us/library/aa906211.aspx>

64-Bit Windows Operating Systems

- 64-bit operating systems place no practical limit to the quantity of memory available to applications. 32-bit Revit-based applications will access between 3 and 4GB of RAM in a 64-Bit OS environment if at least 5GB of total memory is available. The Windows OS will always reserve at least 1GB of memory for OS services and hardware management. A total of 8GB of memory is recommended for such systems to make available 4GB of memory to the Revit platform, at least 1GB for the OS, and additional memory for other commonly used applications to run comfortably alongside the Revit-based applications.
- A 64-bit OS will provide similar performance to a 32-bit OS. However, due to the capability of the Revit platform to access additional memory, Revit may exhibit increased stability and performance when editing larger models.

Network Recommendations

Performance

The Revit platform team strongly recommends a gigabit speed local area network (LAN) for workshared projects. The gigabit threshold should be maintained at all stages of the network, including:

- Gigabit speed Ethernet cards at the desktop.
- Category 5e or Category 6 cabling.
- Gigabit switches.
- One or more gigabit Ethernet cards at the data storage device (server or Storage Area Network) housing the central model

When serving a geographically diverse project team across a wide area network (WAN) the Revit platform team strongly recommends traffic optimization and acceleration as provided by several appliances currently on the market.

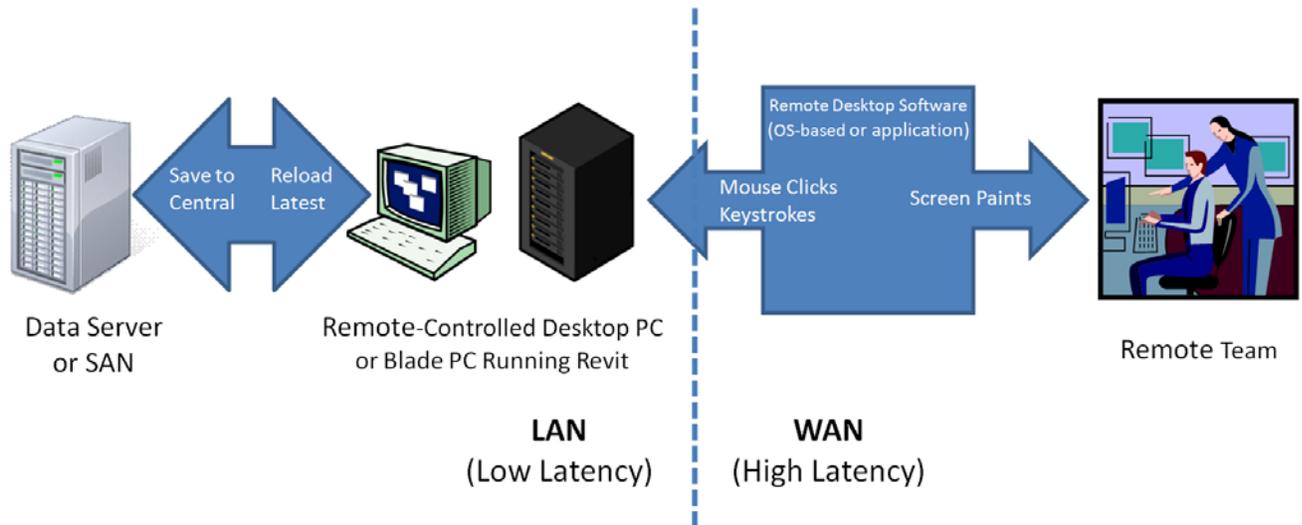
Data Server Specification

Servers storing Revit-based application central files can benefit from:

- Hard drive speeds as fast as economically practical
- Multiple processors

Remote Desktop Sharing

An alternative or additional strategy beyond increasing network and server performance can be remote desktop sharing, where keystrokes, mouse clicks and screen paints are transmitted between remote locations and local desktops dedicated to offsite control for the Revit-based application model interaction, as in the following diagram:



User Group Comments

The Autodesk community maintains a vigorous discussion regarding hardware and operating system performance in the field. Please reference the following links to see the latest comments. Viewing these comments may require a free Autodesk User Group International (AUGI) membership.

<http://forums.augi.com/showthread.php?t=70735> (Desktop recommendations)

<http://forums.augi.com/showthread.php?t=71767> (Hardware benchmarking)

<http://forums.augi.com/showthread.php?t=70896> (ATI & nVidia Video Cards)

Interacting with Autodesk Support

When contacting Autodesk technical support concerning performance issues, please provide the following information and materials to support services:

- A description of the issue, including:
 - When the problem began to occur (if no date is available, an approximate date is better than none).
 - Whether the problem has occurred before.
 - Recent changes, if any, to the hardware and software of the affected machine.
 - A summary of any attempts to resolve the issue before contacting support.
- Accompanying materials:
 - The Autodesk design files involved in the project:
 - Local file
 - Central file
 - Any linked RVT, DWG and DWF files
 - The Revit-based application journal file from the affected computer. See the following link for the procedure to obtain the journal file:
<http://usa.autodesk.com/getdoc/id=TS1067426>
 - If a network problem or operating system problem is suspected, obtain a System Information (NFO) file. See the following link for the procedure to obtain an NFO file:
<http://usa.autodesk.com/getdoc/id=TS1057804>

