



White Paper

Benefits of Moving from AutoCAD LT to AutoCAD 2004

In any industry that requires technical drawings, speed and efficient use of data are key to the success of design projects. And this is where AutoCAD® 2004 software can help. It provides new productivity tools, an improved user interface, and presentation graphics for faster, more productive data creation. It offers password protection and CAD standards tools, for easier data sharing. AutoCAD 2004 provides new network licensing and software inventory tools for more efficient license tracking and management.

This white paper outlines the key benefits of moving from AutoCAD LT® 2004 to AutoCAD 2004. It examines six key areas where AutoCAD 2004 can help improve your design process.

1. Tools for the CAD manager
2. Tools for the IT manager
3. Presentation graphics
4. Breadth of drawing productivity features
5. 3D design capabilities
6. Customization

Tools for the CAD Manager

AutoCAD 2004 includes CAD Standards functionality that enables CAD managers to review and administer standards across the whole design team. Every file shared among your team members readily accrues expensive discrepancies and errors, if unchecked. Users need tools for administering standards that save them time and assure them of compliance in every respect. AutoCAD LT 2004 does not offer this capability.

With the CAD Standards functionality, you can select the type of standard you want checked—dimension and text styles, layers, or linetypes—so the software checks only for violations that are important to your office. The standards manager automatically runs in the background while you work, instantly notifies you of any violation, and suggests a fix.

You can now easily send CAD standards audit reports as email attachments and print them in a reader-friendly format.

Real-Time Notification and Repair of CAD Standards

AutoCAD 2004 provides several methods for you to monitor standards violations. A system setting in the CAD Standards Settings dialog box enables AutoCAD to display an alert and a status bar icon upon standards violation.

Batch Standards Checker

You can use the Batch Standards Checker to analyze multiple drawings and summarize standards violations in an HTML report. To run a batch standards audit, you must first

create a standards check (CHX) file. The CHX file is a configuration and report file; it contains a list of drawing and standards files, as well as a report on a standards check.

By default, each drawing is checked against the standards files that are associated with it. Alternatively, you can override the default and choose another set of standards files to be used.

After the batch standards audit is complete, you can view an HTML report with details and notes of the audit. In a collaborative environment, you can distribute the report to drafters so that they can fix any problems with their sections.

In addition, AutoCAD 2004 has built-in tools such as Layer Translator, Standard Tool Palettes and Reference Manager to help you streamline your CAD standards management.

AutoCAD 2004 software can help remove some of the technical hurdles by enabling you to create, deploy, enforce, and audit standards in your design office, providing measurable benefits to your firm's bottom line. For more detailed information on managing CAD standards, refer to the white paper titled "AutoCAD 2004 and CAD standards" available on the Autodesk website www.autodesk.com/autocad.

Tools for the IT Manager

AutoCAD 2004 license management technology enables IT managers to maximize their companies return on investments.

Network licensing ensures that your users have access to the right software at the right time and enables you to control the use of your software easily and efficiently. Effective use of network licensing software requires investment in planning, implementation, and maintenance. Used properly, it can generate significant benefits for you and your organization.

Some of the key benefits of network licensing include:

- 1. Flexible and efficient use of licenses:** This is the most basic benefit of network licensing. Autodesk uses two types of software licensing. The most common type is the Stand-Alone License Manager, which binds the software to a specific workstation. This type of software licensing is almost transparent to the user and is most effective when there is no need to share the license or move it from one workstation to another. The second type is the Network License Manager, which requires communication between the client software and a software license server. When AutoCAD software runs, it acquires a license from the server, returning that license when it is shut down. Licenses can thus be "floated" over an entire corporate network, transferring instantaneously from one workstation to the next as required.
- 2. Usage tracking:** Because a central license server manages all licenses, an administrator can easily see how licenses are being used. Network License Manager tracking tools allow report creation for information such as total licenses used per department, total hours of usage per week by named users, number of license requests denied, and so forth. This is crucial data for day-to-day administration of licenses as well as input for the budgeting and forecasting process for future software investments.
- 3. Control:** Network licensing gives an administrator more control over the individual user's or group's ability to access software. Licenses can be moved from one group to another without having to install or uninstall software. Individual users can be guaranteed access or denied access to licenses. Specific network license features (such as the ability to borrow a license from the network) can be enabled or disabled as necessary.

4. **Standardization:** The Network License Manager in AutoCAD 2004 is based on FLEXlm[®] technology from Macrovision Corporation, the de facto standard for network licensing. Autodesk introduced this technology in AutoCAD 2002. Use of FLEXlm ensures that you get the latest in network licensing technology as it is developed (an example of this is the new license borrowing capability in AutoCAD 2004). More than 2,500 software vendors use FLEXlm, so it is possible that someone in your organization has already implemented FLEXlm technology.

With the release of AutoCAD 2004, two new features have been added for network licensing, license borrowing and license timeout.

License Borrowing

License borrowing provides you with the ability to install a time-limited license on your computer while disabling the license on the server for that same period. The license enables you to run the AutoCAD program without having a connection to the license server. License borrowing is a great benefit if you need to take your computer on a business trip or occasionally work from home.

License Timeout

License Timeout allows you to set up a timeout period on your license server to automatically return a license to the server so that it is available for use again. License Timeout returns a license to the license server when a client connection is lost, and it also prevents a license from being checked out and unused on a user's computer indefinitely.

Presentation Graphics

Now you can create presentation drawings with high-quality graphics right in the AutoCAD 2004 application without the need for additional software. Specify gradient fills between two colors or between darker and lighter tints of the same color. Print shaded or rendered, 3D isometric presentation views with the Shaded Viewport Plotting feature. And with more than 16 million 24-bit true colors to choose from, including PANTONE[®], RAL CLASSIC, and RAL DESIGN color system libraries, you can apply the exact color you want to your AutoCAD objects. AutoCAD LT 2004, on the other hand, has visual fidelity only for graphics created in AutoCAD 2004.

The Select Color dialog box in AutoCAD has been updated to include multiple tabs. The Index Color tab provides you with the traditional AutoCAD Index Color palette, while two new tabs enable you to use real-world color palettes in your designs. On the True Color palette you can enter values using either HSL (Hue Saturation Luminance) or RGB (Red Green Blue) color models. The Color Books tab enables you to select colors from a variety of PANTONE and RAL DESIGN and RAL CLASSIC¹ color books.

¹ RAL DESIGN © RAL, Sankt Augustin, 2002; RAL CLASSIC © RAL, Sankt Augustin, 2002. Representation of the RAL Colors is done with the approval of RAL Deutsches Institut für Gütesicherung und Kennzeichnung e.V. (RAL – German Institute for Quality Assurance and Certification, reg. Assoc.), D-53757 Sankt Augustin. Please note that the representation of colors on monitors can only approximate the actual color shades as they are registered as lacquered samples. Neither the quality of the present software nor the hardware used is responsible for it.

Gradient Fills

A new Gradient tab available in the Boundary Hatch and Fill dialog box enables you to apply gradient coloring to solid hatch patterns. Choose between one and two color options, various gradient patterns, and rotation angle to get the gradient you require.

The flexibility of the gradient patterns, combined with the new true color, PANTONE®, and RAL DESIGN and RAL CLASSIC color options, enables you to create presentation quality drawings directly from the AutoCAD application.

Shaded Viewport Plotting

In AutoCAD 2004, you can plot shaded and rendered 3D isometric views for presentation output. Functionality includes the ability to plot shaded/rendered models from modelspace as well as paperspace layouts.

Breadth of Drawing Productivity Features

AutoCAD 2004 software offers attribute management tools that enable you to add intelligence to your designs. AutoCAD 2004 also includes external references (xrefs) enhancements, database connectivity enhancements, and quick dimensioning, that the AutoCAD LT 2004 application does not have. AutoCAD 2004 also enables you to batch plot drawings.

Attribute Management

The Block Attribute Manager allows you to modify attributes in block definitions in a simple dialogue interface. For example, you can modify the following:

- Properties that define how values are assigned to an attribute and whether or not the assigned value is visible in the drawing area
- Properties that define how attribute text is displayed in the drawing
- Properties that define the layer that the attribute is on and the attribute line's color, weight, and type

Notification of Drawing Change

AutoCAD 2004 software offers instant notification when an externally referenced drawing has changed. An icon on the status bar is displayed for any drawing with external references (xrefs) attached. If one of the xref files is modified, the icon changes appearance and a bubble notification is displayed indicating the name of the reference file and the person who changed it.

Database Connectivity

AutoCAD software can be used to associate data contained in an external database table with AutoCAD graphical objects through the process of linking. Links are pointers to a database table that reference data from one or more records in that table. You can also use AutoCAD to attach labels that display data from selected table fields as text objects in your drawing.

The AutoCAD 2004 database connectivity feature provides the following:

- An external configuration utility that enables the AutoCAD program to access the data contained in a particular database system
- A dbConnect Manager where you can associate links, labels, and queries with AutoCAD drawings
- A Data View window that displays records from a database table within an AutoCAD session

- A Query Editor where you can construct, execute, and store SQL queries
- A migration tool that converts links and displayable attributes to an AutoCAD 2000 or later format from files created in earlier releases
- A Link Select operation that creates iterative selection sets based on queries and graphical objects

Batch Plotting

Have you ever wanted to print multiple AutoCAD drawings at one time? The Batch Plot utility builds a list of AutoCAD drawings to be plotted. You can use the list to plot immediately or save the list in a batch plot list (BP3) file. The Batch Plot utility (batchplt.exe) is located in the AutoCAD program folder. Alternatively, you can plot multiple drawings using the Design Publisher (PUBLISH) command. You can use BP3 (batch plot list) files with Design Publisher.

You can test the batch plot before plotting. AutoCAD loads but does not plot each drawing in the batch. You can check for missing xrefs, fonts, or shapes.

By creating a log file, you can also record who plotted each drawing and when, and any errors encountered during plotting.

3D Design Capabilities

AutoCAD 2004 enables you to create, modify, render, and navigate 3D objects. AutoCAD LT 2004 does not offer this capability.

3D modeling has several advantages. You can

- View the model from any vantage point
- Generate reliable standard and auxiliary 2D views automatically
- Create 2D profiles
- Remove hidden lines and do realistic shading
- Check interference
- Export the model to create an animation
- Do engineering analysis
- Extract manufacturing data

The AutoCAD 2004 program supports three types of 3D modeling: wireframe, surface, and solid.

A wireframe model is a skeletal description of a 3D object. There are no surfaces in a wireframe model; it consists only of points, lines, and curves that describe the edges of the object. With AutoCAD software you can create wireframe models by positioning 2D (planar) objects anywhere in 3D space. AutoCAD also provides some 3D wireframe objects, such as 3D polylines (that can only have a CONTINUOUS linetype) and splines.

Surface modeling is more sophisticated than wireframe modeling in that it defines not only the edges of a 3D object, but also its surfaces. The AutoCAD surface modeler defines faceted surfaces using a polygonal mesh.

Solid modeling is the easiest type of 3D modeling to use. With the AutoCAD solid modeler, you can make 3D objects by creating basic 3D shapes: boxes, cones, cylinders, spheres, wedges, and tori (donuts). You can then combine these shapes to create more complex solids by joining or subtracting them or finding their intersecting (overlapping) volume. You can also create solids by sweeping a 2D object along a path or revolving it about an axis.

AutoCAD new 3D graphics system takes advantage of OpenGL to rotate, shade, and apply textured materials and lights to 3D models. AutoCAD 2004 supports OpenGL-based software

acceleration and OpenGL-based hardware acceleration for the fastest possible 3D performance.

Plotting 3D Drawings

If you are plotting a drawing that contains 3D solids that are shaded, you can control how the drawing is plotted.

Specifically, you can choose from the following options:

- As Displayed: Plots the design as it is displayed; all the shading is preserved.
- Wireframe: Displays lines and curves to represent object boundaries.
- Hidden: Suppresses the plotting of objects that are located behind other objects.
- Rendered: Renders objects before they are plotted, based on Render options you set before you plot.

Customization

The AutoCAD 2004 platform offers fully extensible drawing and application customization through APIs (application programming interfaces) such as AutoLISP®, Visual LISP®, VBA, and ActiveX®. AutoCAD LT 2004 is not an extensible product.

Autodesk works together with thousands of software partners from around the world to create additional applications for AutoCAD. These partners further enhance our broad range of fully integrated and interoperable solutions, for every design profession you can imagine. Visit partnerproducts.autodesk.com for a comprehensive list of products available for AutoCAD 2004.

AutoCAD software also provides a flexible development platform for specialized design and drafting applications. Its open architecture enables developers to customize AutoCAD for unique purposes. Examples include Autodesk's industry-specific design software, add-on applications from partner developers, and use of AutoCAD software as an interface to other applications.

AutoLISP/ Visual LISP

The Visual LISP tool is used for code creation within the AutoCAD software application. It is a full-featured, interpretive programming language that you can use to call AutoCAD commands, system variables, and dialog boxes.

Visual LISP offers a complete development environment including:

- Reduced development time using the modern integrated development environment (IDE), which makes it easier and faster for users and developers alike to create, debug, and deliver AutoLISP-based applications
- Access to ActiveX objects and event reactors
- Source code protection against theft and alteration
- Operating system file-operation functions
- LISP function extensions for list processing

Microsoft Visual Basic for Applications

The combination of the powerful ActiveX Automation Object model in AutoCAD and Microsoft® Visual Basic® for Applications (VBA) presents a compelling framework for customizing the AutoCAD software program. Using ActiveX Controls and other applications that host VBA (such as Microsoft Office), you can work any number of objects with when developing custom AutoCAD solutions.

AutoCAD 2004 includes changes to the ActiveX Automation interface used by Microsoft's Visual Basic for Applications (VBA) and Visual Basic (VB) software. New, removed, or altered items in the interface track to the new features and changes to existing features in AutoCAD 2004.

ObjectARX

ObjectARX[®] libraries comprise a versatile set of tools for application developers to take advantage of the open architecture of AutoCAD and provide direct access to AutoCAD database structures, the graphics system, and native command definition. ObjectARX technology helps you develop fast, efficient, compact applications. It enables power users to customize AutoCAD software and frees CAD designers from repetitive design tasks. Smaller files, faster drawing operations, and seamless interoperability make an application built with ObjectARX your best choice for a design software solution.

Conclusion

AutoCAD 2004 software introduces new productivity tools and presentation graphics for fast data creation; CAD standards tools for easier data sharing; and new software licensing tools for more efficient data management. And it's the fastest version of AutoCAD— ever.

Whether you use AutoCAD for 2D drafting, detailing, design documentation, or introductory 3D design, you can personalize or program the software to meet your specific design needs, or add an industry-specific application built to work with AutoCAD. AutoCAD software is the worldwide standard in computer-aided design (CAD). More people use AutoCAD than any other CAD software.

All this provides you with a compelling reason to upgrade your AutoCAD LT to AutoCAD 2004. AutoCAD 2004 software offers new and enhanced functionality that enables you to create with speed, share with ease, and manage with efficiency.

For more information about the AutoCAD 2004 application, visit www.autodesk.com/autocad.

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