

AutoVue Enterprise Visualization: Providing a Foundation for Viewing, Markup, and Real-Time Collaboration

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INTRODUCTION

In the age of the digital enterprise, hundreds of thousands of global companies are creating, editing, and managing millions of digital engineering files every day—all of which are created in an assortment of different applications and run on myriad platforms. But the “islands of automation” and the wealth of disconnected information stores that are cropping up as a result are now affecting productivity and profitability.

If today’s digital enterprises are to increase efficiency, reduce errors, and drive productivity, they must make their digital content accessible and understandable to key parties within and outside their organizations. Oracle’s AutoVue enterprise visualization products are the key.

To deal with this problem, organizations need to integrate and widen access to the hodgepodge of digital information assets to those both inside and outside their walls. One way they’ve begun to do so is by using product lifecycle management (PLM) tools and enterprise resource planning (ERP) software to provide a comprehensive engineering infrastructure. Still, to gain a high-level view and understanding of that infrastructure, the walls among engineering, manufacturing, sales, and marketing must be broken down. And to do that, organizations need a multiformat visualization solution that can breach those walls and improve interdepartmental collaboration, communication, and productivity.

Oracle’s AutoVue solutions are designed to meet all of an organization’s visualization requirements. They can serve as the window for visualization across all enterprise applications and can even meet the basic viewing needs of individual desktops. By enabling users to view, print, and collaborate on any digital information asset from any system, users can achieve true enterprise visualization and ensure the success of projects.

INDUSTRY CHALLENGES

Analysts and consultants agree that if today’s digital enterprises are to increase efficiency, reduce errors, and drive productivity, they must make their digital product and asset information accessible and understandable to key parties within and outside their organizations. This means that collaborative work must extend not only across an enterprise but also to its supply chains and to geographically dispersed design, manufacturing, and assembly locations.

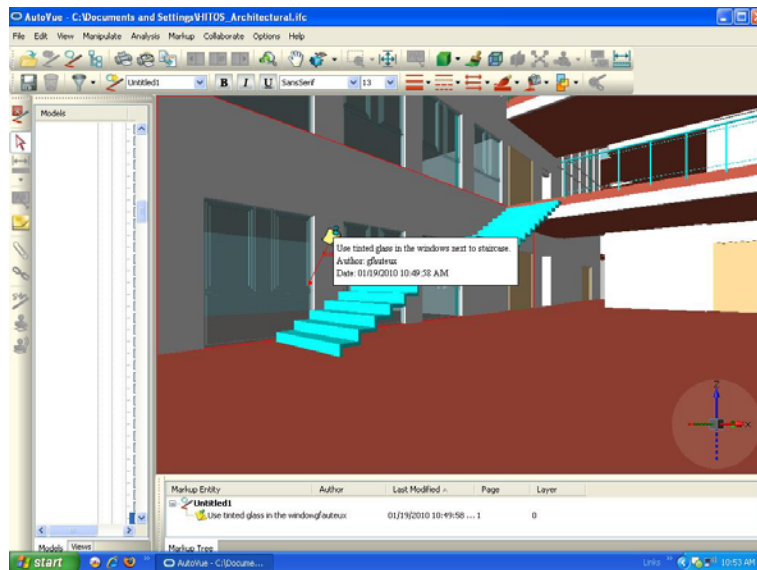


Figure 1: Add comments to building and facilities models during 3D Walkthrough

To meet this goal, organizations are adopting enterprise systems that manage products from concept to redundancy (at which point the product is decommissioned or recycled). In such systems, the “managed” products encompass much more than just engineering drawings generated in computer-aided design (CAD) software. They also include all documents related to scheduling, stock control, shipping, financials, repair maintenance, and field service (all of which would typically be controlled by a PLM system and integrated into other key business applications such as ERP).

For such a system to work, however, all parties—across several departments, and including customers and partners—must be able to view pertinent, integrated information. But with product and asset information being created with a plethora of software, replicating full-blown applications for all who need to view the resulting data is a prohibitively expensive task—not to mention unwise for security reasons. And mass-converting thousands (or even millions) of documents to an industry-standard distribution format represents a complex and expensive undertaking—especially when changes to the original mean that the conversion process will need to be carried out all over again.

This is the reason that many companies are incorporating multiformat visualization solutions into their enterprise systems. Clearly, what’s needed is an easy-to-use, flexible visualization application that can integrate into existing and evolving IT infrastructures (possibly with mixed platforms), and that can support new and legacy native file formats.

THE ORACLE SOLUTION: AUTOVUE ENTERPRISE VISUALIZATION

The AutoVue suite of enterprise visualization solution fulfills diverse requirements, meeting the needs of both end users and mixed-platform extended enterprises. AutoVue was developed for professionals in the mechanical CAD,

architecture/engineering/construction, (AEC) and electronic design automation (EDA) markets. However, it also supports a host of traditional digital Microsoft Office-style formats, portable document format (PDF), tagged image file format (TIFF), as well as image formats. The AutoVue family includes the following products:

- **AutoVue Office.** Delivers support for Office, PDF, and graphical formats—providing viewing, printing, and annotation capabilities.
- **AutoVue 2D Professional.** Delivers visualization of 2-D CAD designs such as AutoCAD and MicroStation, as well as Office document types. Comprehensive markup and annotation tools including text, color fills, hyperlinks, vector lines, and pointers are also included.
- **AutoVue 3D Professional Advanced.** Supports 3-D CAD models, in addition to including the core functionality of AutoVue 2D Professional. AutoVue 3D Professional Advanced displays parts-and-assemblies models from essential solid modeling applications (such as CATIA, SolidWorks, Inventor, Pro/E, and UG) and includes comprehensive markup capabilities—delivering the ability to add text and precise 3-D markup measurements to points on a part or assembly. It also includes a compelling 3D walkthrough which allows users to perform detailed reviews of 3D facilities.
- **AutoVue EDA Professional.** Provides native document viewing for the major EDA software packages, such as Mentor, Cadence, and Zuken, and delivers a comprehensive solution for multiformat design review, annotation, cross-probing, design verification and real-time collaboration.
- **AutoVue Electro-Mechanical Professional.** AutoVue Electro-Mechanical Professional is the most complete AutoVue solution. It features native document viewing, markup, cross-probing, and electro-mechanical digital mockup capabilities for the widest range of document types, including printed circuit board (PCB) layouts and schematics, 3-D parts and assemblies, 2-D CAD drawings, and Office documents.. With support for MCD and EDA documents, this solution bridges the gap between MCAD and EDA teams and enables cross functional design collaboration and reviews.

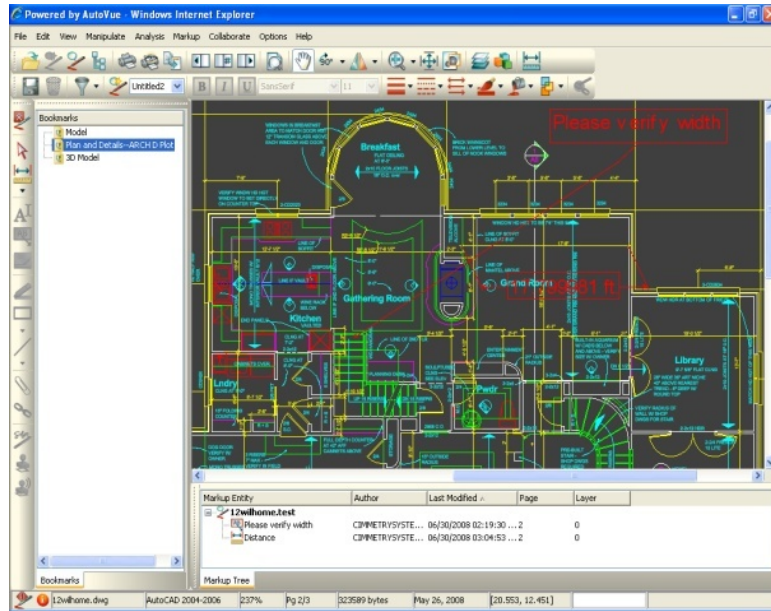


Figure 2: Viewing and marking up architecture, engineering, and construction drawings in AutoVue enterprise visualization solutions

Web-based Visualization

AutoVue solutions are web based and represent an ideal solution for deployment across geographically dispersed project teams and enterprises that need to share documents and information via the web .

With web based visualization, groups of engineers and architects can review design files simultaneously in real time via the Web while simultaneously adding markups and manipulating the session view.

AutoVue makes it possible for groups of engineers, architects or repair technicians to review product or asset files simultaneously in real time via the Web, while adding markups and manipulating the session view. What’s more, because it’s browser-based, it is easily installable on a variety of operating systems. As such, deployment and maintenance are simple, and security is improved because native files are never sent for viewing (instead, AutoVue generates and sends a streamed viewable image of the file).

Real Time Document Reviews via the Web

Because of AutoVue’s interactive, real-time collaboration capabilities, users can e-mail participants to join a hosted review session at a specific time, and users can employ the internet or an internal network to log in to an active AutoVue real-time collaboration session. On joining a session, the file to be reviewed is loaded by all participating AutoVue clients and synchronized.

Although other collaborative applications on the market limit the input of session participants, allowing only the host to manipulate markups, AutoVue allows reviewers to view and manipulate the document independently while adding markups (which are visible on all members’ displays). Control of the session (which

really means control of the common view displayed) can be exchanged among session members.

Although other applications on the market limit the input of session participants, allowing only the host to manipulate markups, AutoVue allows users to view and manipulate the document independently while adding markups (which are visible on all members' displays).

With each project reviewer assigned a different color, markups and comments are easily differentiated. AutoVue also allows session members to add feedback, and it provides an instant chat messaging system that gets stored as a session log.

By targeting the key area in which teams need to collaborate AutoVue can save companies a lot of money and time and expense wasted in unnecessary travel and time out of the office.

Work Offline with Engineering and Asset Documents

AutoVue also features an offline mode allowing users to easily switch between online and offline modes of operation. While connected to the network or backend system users click on a button to select the Work Offline option, along with the files needed for offline work, and they are ready to leave the office. Field workers or business travelers can take documents on site or on the road, work offline, and then update their comments or feedback to enterprise systems once they are back online. Offline work can easily become part of a file's audit trail of updates and decisions.

Format Support

Supporting a massive array of file formats, AutoVue solutions support hundreds of 2-D CAD, 3-D CAD, EDA, engineering, and Office formats. In addition, AutoVue supports more formats with each new release and gets frequent updates to augment existing formats as native products are released.

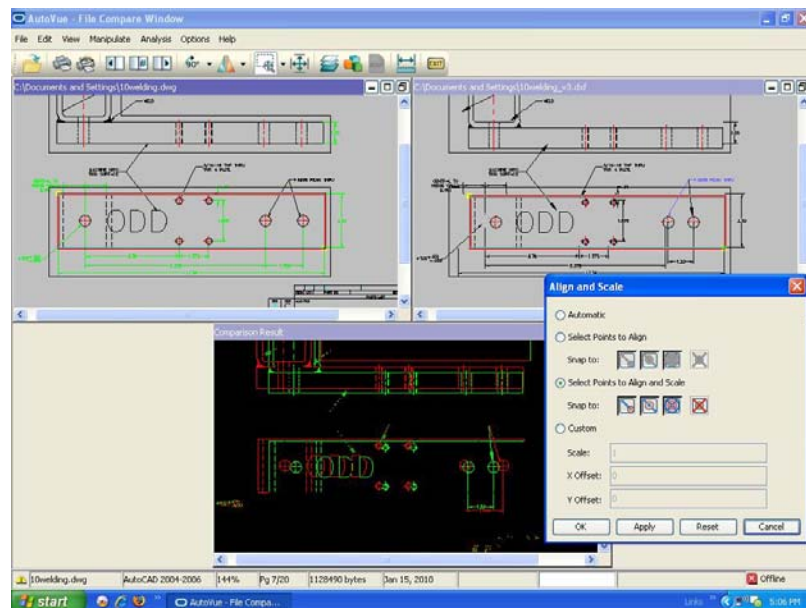


Figure 3: Compare two versions of a drawing and optimize revision processes with AutoVue

Visualization

AutoVue's easy-to-use, customizable interface includes a number of standard functions that users can employ to interrogate documents. Users can use interface tools to zoom in and out, or do so dynamically. Other manipulation features include pan, rotate, and flip. In addition, AutoVue supports right-button mouse commands, which vary according to file type.

Each of the 2-D CAD, mechanical CAD, and EDA file viewing windows contains a menu tree with selectable options, including Modelspace/Paperspace, sheet and page views, quick access to feature tree "parts" in modeling assemblies, and a tick box to select which model features should be displayed. The EDA viewing window is populated with component listings; component pins; and networks, or various schematic layouts contained within a drawing. Clicking a node highlights a corresponding graphic.

AutoVue also comes with a range of utilities for interrogating and viewing embedded information within documents (such as layers, blocks, saved views, reference files, entity handles, attributes, and text). One handy utility extracts the text from within a document and saves it as a text dump for possible inclusion in reports or e-mails. AutoVue also has a powerful Compare feature that allows two files (2-D, 3-D, EDA) to be loaded in a three-window environment, displaying which data has been added, which has been subtracted, and which has remained unchanged. Zooming in on any of the display windows updates all other views.

Printing and Plotting

Because it uses a standard Windows print driver, AutoVue can print or plot to any output device. This means you can print and plot the extent of a drawing or selected area, and you can use the program's handy Print Preview function to ensure that the selection prints properly. You can also set the page range to be printed, and prior to output, you can add headers, footers, and stamps to indicate file name, date, and time. AutoVue also includes a watermark capability and a Batch Print/Plot function with a Force to Black option.

Digital Markups and Annotations

Users can add markups, annotations, and comments via AutoVue's comprehensive suite of markup tools. Stored in separate files linked to the original, these changes don't alter or amend the original file. As users add markup entries to the drawing, the markup navigation tree displays them. When a user clicks an entry, the corresponding markup in the drawing highlighted, easily locating the markups. .

In AutoVue 3D Professional Advanced, users can also add accurate 3-D distances between vertices. As the model rotates, these markups remain in view, so that users can simply click the dimension and move the mouse to resize the text. When applying text or notes to a 3-D model, users can affix them to a vertex, edge, face, midedge, or arc centre. Once applied, these notes follow users as they navigate the model, and the markup navigator provides quick access to any number of notes or

redlines. Users can also employ AutoVue's tools to mark up 2D, EDA and Office file types. Markups are captured and stored with the original file and serve to deliver a reliable audit trail of decisions, changes and revisions

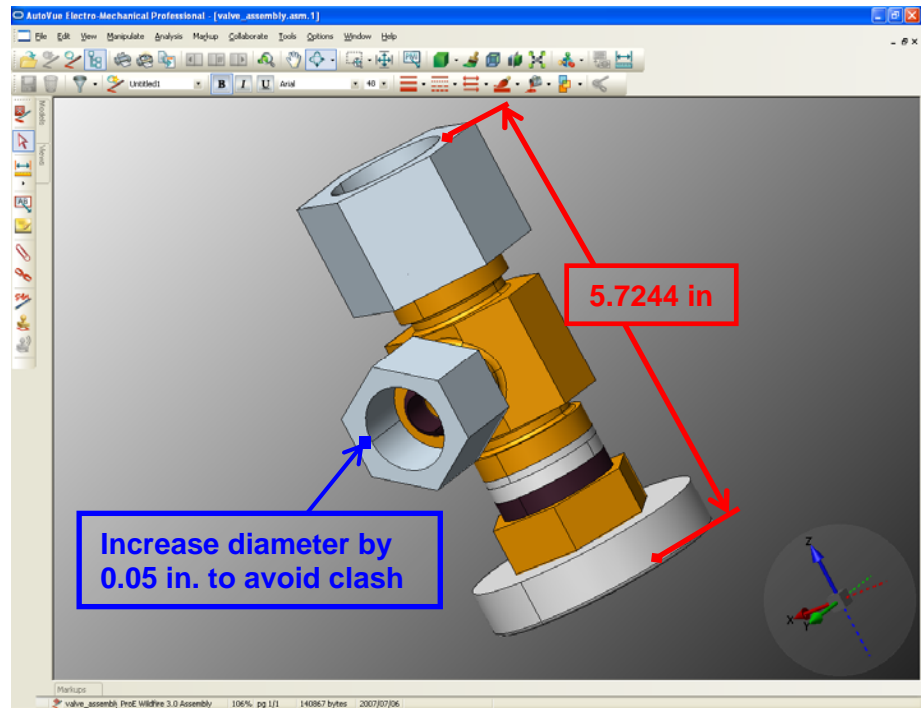


Figure 5: Add digital comments and markups to 3D models

Enterprise System Integration

Organizations can easily integrate AutoVue into existing and evolving IT infrastructures. With its Web technology and open integration architecture, organizations can plug the solution into content repositories and enterprise applications and allow it to serve as the visual front end to all digital information assets. With AutoVue integrations, users get a complete, open and standards-based set of integration tools.

With AutoVue integrations, users get a complete, open and standards-based set of integration tools that allows them to have a consistent view of data and business objects, create powerful visual composite applications, and expand workflow automation to document-based processes.

These integration tools include:

AutoVue VueLink Integrations. VueLinks are Oracle developed pre-integrated solutions, which connect AutoVue to popular Product Lifecycle Management (PLM) and Content Management systems. The VueLink integration serves as a "bridge" that securely streams documents from an enterprise system's repository to AutoVue for viewing, digital markup and real-time collaboration. Digital markups

are saved back in the content repository and associated with the base file for easy tracking and traceability. AutoVue VueLink Integrations are available for Oracle Universal Content Management (UCM), Oracle Agile PLM, EMC Documentum, ENOVIA MatrixOne, and Microsoft SharePoint.

AutoVue Integration Software Development Kit (iSDK). The AutoVue iSDK allows users to go one step further in their integration projects to consistently render information from disparate systems and visually enable any enterprise application (PLM, ERP, Project Management, etc). AutoVue's Web Services based iSDK allows customers and Systems Integrators to build and customize their own integrations in any deployment environment.

AutoVue Web Services – To support integrations within a Service Oriented Architecture (SOA) framework, AutoVue provides a comprehensive set of Web Services capabilities. Through Web Services, organizations can ensure a consistent, flexible, and repeatable approach for augmenting existing business applications with enterprise visualization services, creating visual composite applications and taking workflow automation one step further.

Offering a suite of products with various deployment options and a single common interface, AutoVue solutions can serve as the front end for all document viewing—whether the document in question adheres to a native application format or an industry open standard and regardless of how a user is accessing it or where the documents reside.

CONCLUSION

Offering multiple solutions and deployment options and a single common interface, AutoVue can serve as the front end for all document visualization and collaboration—whether the document in question adheres to a native application format or an industry open standard and regardless of how a user is accessing it or where the document resides. .

Already offering one of the most comprehensive visualization solutions on the market, Oracle continues to add support for more file types. This combined with the fact that AutoVue has unique interrogation tools, real time web collaboration and easy integration capabilities, makes the software solution a one-stop shop for organizations with product, asset and engineering documents that need to be viewed by all enterprise users in a variety of business processes and workflows AutoVue is a natural choice for across-the-enterprise deployment.



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