The Importance of Vectorworks 2009 to Building Information Modeling

For many in the A/E/C industry, Building Information Modeling (BIM) has become synonymous with 3D; a BIM project incorporates all the aspects of design from geographic information, to building geometry, to component relationships, and finally, to the quantities and properties of the building components required. Much like Product Lifecycle Management (PLM) for manufacturing, BIM requires a purpose-built foundation to manage the amount of data generated. In the manufacturing industry, the 3D modeling requirements for PLM applications date back to the mid 1980's, as manufacturers demanded design software that would enable them to speed their product development process. As a result, PLM software kernels like Siemens PLM software, Parasolid®, are very mature and robust; built on a highly scalable, flexible, accurate 3D platform that has come to be recognized as the best in class.

BIM applications have not been built to the same demanding standards. They have grown to meet the information management needs of a handful of actual practitioners. Therein lies the problem. Large and mid-sized commercial projects must document and model hundreds of thousands of components. Without a scalable 3D modeling application, you run the risk of documenting a limited or inaccurate model.

BIM must evolve to meet complex, large-scale, 3D modeling needs. The best way to build a strong modeling platform is to leverage the manufacturing industry's investment in software development. Embedding Parasolid's modeling software engine, while incorporating A/E/C-based BIM capabilities, creates an extremely scalable, flexible, and accurate BIM platform. At Nemetschek North America, that's exactly what we've done through our partnership with Siemens PLM software. Already an A/E/C industry leader in 3D modeling with our unique ability to support free-form modeling, we've licensed and incorporated the Parasolid kernel into our Vectorworks application to transform it into the best-in-class of architectural 3D modeling.

Let's take a look at the impact of BIM on the A/E/C industry, what it means to be the best-in-class of architectural 3D modeling, and how a best-in-class architectural 3D modeling application facilitates an efficient design.

What is Parasolid?

Parasolid is, simply put, the best 3D modeling kernel available today. Built by Siemens PLM software, Parasolid includes unsurpassed 3D modeling capabilities—it can handle larger and more complete models, support higher levels of modeling automation, manage data accurately and consistently, and provide the interoperability necessary to facilitate the seamless exchange of data through all phases of design.

The embedded Parasolid kernel provides Vectorworks users with high performing, extremely stable, accurate modeling capabilities applied across the design lifecycle establishing Vectorworks as a best-in-class application. Based on precise boundary representation technology, the Parasolid kernel in Vectorworks supports solid modeling, generalized cellular modeling and freeform surface/sheet modeling within an integrated framework.

Over 2.5 million end user seats of Parasolid-enabled applications are in use today.

Why Parasolid and Vectorworks?

Already an A/E/C industry leader in 3D modeling with our unique ability to support free-form modeling, Nemetschek North America licensed and incorporated the Parasolid kernel into our Vectorworks application to transform it into the best-in-class of architectural 3D modeling. Together the Vectorworks and Parasolid combination provide the A/E/C industry with the most scalable, reliable, and feature rich 3D design application available today. With Parasolid at its core, Vectorworks enables you to model any geometry you can visualize. If you can imagine it, Vectorworks with Parasolid can represent it.

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BIM and the A/E/C Industry

From a conceptual and philosophical perspective, BIM is a better way to design, construct, and manage buildings. It allows architects to design more efficiently, construction firms to better manage costs, and owners to stay on budget and control day-to-day operational costs. BIM fulfills the promise of economic gain and also better business relations. Excessive change orders, resulting from communication errors or missing information, negatively reflect on owner's perception of architects and construction firms. Architects and construction firms with a reputation for costly overruns tend to lose business.

As the key technology shared between architects and construction firms, CAD applications have taken center stage in the movement to take BIM mainstream. CAD's ability to capture and represent the geographic information, building geometry, component relationships, and quantities and properties of building components is at the heart of BIM. Several CAD vendors tout their applications as central to the BIM process, capable of managing the complex 3D information model generated on a BIM project. But are they really? As BIM evolved, architectural intelligence was built on top of primitive foundations. Many BIM applications have limited functionality and key elements of the model cannot be represented in 3D; most do not have a modeling kernel reliable or fast enough to handle large, detailed 3D models. Without the efficiency of a purpose-built 3D modeling kernel, good visualization becomes an extremely time-consuming process.

We have the answer to BIM's technological problems: adopt the time-tested platform used by the MCAD industry to build the best architectural 3D CAD solution available. With a purpose-built 3D modeling kernel, Vectorworks 2009 manages building complexity which previously tested the limits of most BIM applications.

Parasolid: At the Heart of Vectorworks 2009

With more than half of Vectorworks users incorporating 3D into their daily workflow, providing an improved, accurate, and comprehensive modeling kernel was of the utmost importance. Nemetschek N.A. elected to build for the future with the most advanced 3D technology available, by incorporating Parasolid at the heart of Vectorworks.

Parasolid is, simply put, the best 3D modeling kernel available today. Built by Siemens PLM software, Parasolid includes unsurpassed 3D modeling capabilities—it can handle larger and more complex models, support higher levels of modeling automation, manage data accurately and consistently, and provide the interoperability necessary to facilitate the seamless exchange of data through all phases of design. Over 2.5 million end user seats of Parasolid-enabled applications are in use today.

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Vectorworks 2009: Best-in-Class of Architectural 3D Modeling

The embedded Parasolid kernel provides Vectorworks users with high performing, extremely stable, accurate modeling capabilities applied across the design lifecycle, establishing Vectorworks as a best-in-class application.

In real world numbers, Vectorworks 2009 is up to 12 times faster for Boolean operations, including surface addition, subtraction, and intersection. Viewport renderings are two to four times faster than they were in Vectorworks 2008. And, 3D modeling operations are four to five times faster in Vectorworks 2009.

While you design, modeling calculations and error handling are managed by the most accurate 3D kernel technology in the world. Design efficiencies inherent in the Parasolid kernel make Vectorworks 2009 the application of choice for any size project.

For BIM applications to have a positive impact on the A/E/C industry, they must be able to model, manage, and exchange complex design information. Now with the best modeling kernel available, Vectorworks 2009 leads the BIM marketplace in key technology. Integrating Parasolid into Vectorworks 2009 expands our 3D technical strengths, including the ability to do it all within one application.

The Parasolid advantages now available in Vectorworks include:

- Geometric accuracy: Lines and planes are simple to calculate. But, once you start using curved shapes in your models, you need to ensure you have the most accurate calculations available. Whether incorporating a curved landscape wall or adding thickness to your free-form building skin, Vectorworks 2009 maximizes the accuracy of the result.
- Scalable efficiency: Large BIM models have an extraordinary amount of geometry, which can be very difficult to manage within a CAD application. With over 700 developer years of research and development investment, the Parasolid kernel is the best in the world at managing large models. Not only is it optimized to efficiently use available hardware resources, Parasolid uses techniques to better manage, manipulate, and model large systems.
- Unlimited 3D freedom: With Vectorworks 2009 you can model virtual any buildable geometry, allowing easy exploration of “what if” scenarios without the restrictions of modeling limits. If you can imagine it, Vectorworks 2009 can represent it.
- Multiprocessor support: Once you have the most efficient techniques, using multiple processors is the next step to maximizing speed, by splitting the modeling duties across multiple processors. Vectorworks 2009 features multiprocessor support for the Windows® operating system; multiprocessor support for Mac OS X (10.5 Leopard) will be announced in the near future.
- Solid modeling: With Vectorworks 2009, modeling accuracy is extremely high, resulting in successful 3D modeling operations.
- Feature modeling: Vectorworks 2009 with Parasolid provides robust feature modeling; protrusions, filleting, chamfering, and shellings are speedy and bullet-proof.
- NURBS surfaces: projections, lofting, interpolated and draped surfaces, as well as contouring, are all improved by the robust Parasolid engine and provide resolution-independent smooth curved surfaces.
- Combined NURBS and solids: Solid geometry can be decomposed into its surfaces for NURBS deformations, and NURBS surfaces can be “stitched and trimmed” into free-form solid shapes.
- Walls: Vectorworks’ sophisticated wall technology is now based on Parasolid, allowing holes of any shape to be created and accommodating unusual window shapes within walls.
- Rendering: Parasolid’s faceting technology results in much faster, improved rendering in Vectorworks.
- Functionality enhancements: Extrude along path improvements allow users to create smooth, curved shapes like stair handrails.

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Realize Your Most Inspired Visions

Regardless of the size of your practice or the complexity of your design projects, Vectorworks 2009's best-in-class 3D modeling capabilities will enable you to design more efficiently. With the industry's leading 3D modeling kernel at its core, Vectorworks lets you spend less time working on the tedious details such as verifying accuracy and completeness and more time actually designing—using the workflow of your choice. Unlike other BIM applications, Vectorworks 2009 is at its heart a design application. Whether your focus is on simple, clean design, or incorporating the most technically challenging geometric shapes into your work, Vectorworks 2009 lets you realize your most inspired visions.

Vectorworks 2009 offers unrivaled 3D modeling capabilities built on the most robust platform available today.

Vectorworks 2009 Benchmark Scores

What the integration of Parasolid means in your real-world application:

- Vectorworks 2009 is up to 12x faster for Boolean operations, including surface addition, subtraction, and intersection
- 3D modeling operations are 4-5x faster in Vectorworks 2009
- Viewport renderings are 2-4x faster in Vectorworks 2009

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