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PLM Components

Robust industry-leading functionality adds value to your product

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Overview

PLM Components provide comprehensive capabilities for geometric modeling, simulation, visualization and data interoperability.

Siemens Digital Industries Software offers a comprehensive portfolio of software development toolkits (SDKs). Also known as PLM Components, they are used by independent software vendors (ISVs) to create end-user applications for the computer-aided design (CAD)/computer-aided manufacturing (CAM)/computer-aided engineering (CAE)/architectural engineering and construction (AEC)/electrical computer-aided design (ECAD), robotics and specialty markets like medical devices and garment design. PLM Components provide comprehensive capabilities for geometric modeling, simulation, visualization and data interoperability. As the world's leading provider of engineering SDKs we invite you to partner with us.

PLM Components are the result of hundreds of years of research and development (R&D). Featuring a proven history of continuous innovation, we've pioneered disruptive technologies like Direct and Convergent Modeling™ technology for geometric modeling and the JT™ data format for lightweight 3D visualization. Our toolkits keep pace with the demanding and rapidly evolving requirements of our global customer base. For example, we support applications that utilize cloud-based services and machine autonomy without losing our focus on product stability and performance.

Our R&D and support teams have deep industry knowledge and offer domain-specific expertise for integrating our components into your software. Our products are coupled with comprehensive customer support, training and documentation. We consistently deliver new releases that are compatible with both subsequent and previous releases. In addition, our data formats are published standards that enable your customers to easily exchange data with other applications.

We license PLM Components as part of our "level playing field" policy. This policy means that the PLM Components offered for sale are the same exact components at the same release level that we use ourselves throughout our end-user portfolio. Our Digital Innovation Platform portfolio of products is the most comprehensive in the world. It includes market-leading products like NX™ software, Solid Edge® software, Catchbook™ software, Simcenter™ software, Teamcenter® software and the Tecnomatix® portfolio. We build our own products with the same exact PLM Components that we license to partners, universities and competitors. This means that you can build your applications on the same core technologies used by one of the world's largest providers of industrial software.

We've operated this way for decades. As a result, our PLM Components are industry proven. They are among the most widely used 3D software development toolkits in the world. More than 350 companies license our PLM Components for use in over 450 commercial applications used by over 6 million software end-users. They are among the most popular engineering SDKs in the world because they provide innovative, high quality, robust, cost-effective core functionality at a fraction of the cost of developing and maintaining in-house technology.

The PLM Components portfolio offers value for any application that requires geometric modeling, motion simulation, path planning, visualization and/or data interoperability. Our brands are Parasolid® software, D-Cubed™ software, Kineo™ software, Iray+ and JT. We also offer HOOPS products from TechSoft3D for visualization and data exchange. Our customers include established companies like Autodesk, Ansys, Bentley, the Nemetschek Group and Solidworks as well as start-ups like Onshape, Shapr3D and SimScale. Our components will reduce development costs, accelerate time-to-market and shorten time-to-revenue whether you are a start-up or a large, established company.

Our R&D and support teams have deep industry knowledge and offer domain-specific expertise for integrating our components into your software.

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Geometry

Parasolid

Parasolid is one of the world's leading 3D geometric modeling toolkits. It is used by over 160 software vendors in more than 350 commercial applications in the CAD/CAM/CAE, robotics, machine tools and AEC domains. Parasolid is used to create, edit and view digital 3D models. It supports a range of modeling techniques, including solid, facet, direct, general and freeform surface/sheet modeling. Parasolid provides graphical and rendering support for precise, hidden line and wireframe views. It also offers extensive functionality for solid model analytics.

Parasolid is commercially licensed at three levels depending upon the functionality required: Communicator, Editor, and Designer. Communicator provides basic functionality for model visualization, interoperability and analytics; Editor adds model editing capabilities; and Designer enables comprehensive functionality for model creation, editing and visualization.

The functionality in the Communicator, Editor and Designer licenses can be augmented with Convergent Technology, Data Exchange solutions and Bodyshop. Convergent modeling technology extends Parasolid's robust precise (B-rep) modeling functionality to facetted models. This is especially useful for reverse engineering workflows that use scanned 3D geometries because it eliminates the time-consuming and tedious process of transforming the scanned model into a precise model.

The Parasolid portfolio includes direct translators for reading and writing various 3D data formats. This enables the import and export of 3D models in alternative formats. Parasolid Bodyshop is available to repair 3D model data that is imported from incompatible or inferior modeling systems.

D-Cubed

The D-Cubed portfolio consists of six components. The 2D Dimensional Constraint Manager (DCM) is used for parametric sketching while the 3D DCM is used for constrained assembly modeling. The Profile Geometry Manager (PGM) is used to create new 2D offset profiles, and the Hidden Line Manager (HLM) is used to produce drawings and illustrations of CAD models. The Assembly Engineering Manager (AEM) is used to simulate the motion of assemblies and mechanisms while the Collision Detection Manager (CDM) detects collisions and interferences between parts.

Path planning and robotics

Kineo technologies are especially important in robotics, machine tool and digital mock-up applications.

The Kineo portfolio offers components that enable automatic path planning, collision detection and flexible cable simulation. The KineoWorks™ library is a path planning component that computes collision-free motion for robotics, machine tools and assembly/disassembly verification. It also enables machine cycle optimization based on cycle speed, energy consumption and operation sequencing. Kineo Collision Detector performs high-speed collision analysis on 3D polygonal models to resolve collisions that would prevent the successful manufacture of an assembly or impede the intended motion of parts. Kineo Flexible Cables simulates the behavior of compliant cables including hoses and electrical cables.

Integrated collision detection ensures that cables do not interfere or collide with the robot or machine tool. Functionalities include prediction of cable tension, flexion and torsion that includes the dynamic effects of gravity, inertia and geometric non-linearity. Kineo technologies are especially important in robotics, machine tool and digital mock-up applications.

Visualization

HOOPS Visualize

HOOPS Visualize is a comprehensive 2D/3D graphics toolkit. It supports desktop and mobile applications and is notable for its general-purpose nature. It supports operations for engineering models, such as precise selection, hidden line removal, dimensioning, product manufacturing information (PMI) and advanced rendering. It is compatible with all major graphical user interface (GUI) toolkits. HOOPS Visualize is tightly integrated with Parasolid through the HOOPS Visualize Parasolid Bridge. This software bridge is provided at no cost to Parasolid licensees and helps ensure a quick and easy integration of graphics into Parasolid applications.

Iray+

Iray+ is a powerful photo-realistic ray-traced and graphics processing unit (GPU) accelerated rendering toolkit based on NVIDIA's Iray technology. It includes a large library of materials and scenes and uses multithreading to take advantage of modern microprocessors and GPUs. It accelerates the creation of photorealistic renderings of design mockups.

PLM Vis Web

PLM Vis Web is used to create custom web viewers. Customers can stream, view and manipulate 3D JT models in any web browser that supports WebGL. Viewer features include measurement of distance, angle, area and volume. Multiplane sectioning is also supported. The range of applications is only limited to what can be implemented in a web page.

Interoperability

HOOPS Exchange

HOOPS Exchange is a comprehensive data access and translation SDK that delivers access to over 30 CAD and industry standard file formats through a single interface. It enables access to a broad range of data including boundary representation (BREP), polygonal, PMI, model tree, views, and persistent IDs. HOOPS Exchange is integrated with Parasolid through the HOOPS Exchange Parasolid Bridge, which also utilizes Siemens Bodyshop technology for automated model healing and repair. The HOOPS Exchange Parasolid Bridge is provided at no additional charge to Parasolid licensees and ensures a quick and reliable integration of a comprehensive array of input and output formats into and out of your Parasolid-based application.

Parasolid Translators and Bodyshop

Parasolid Translators are toolkits that provide functionality for geometry translation between the Parasolid XT data format and other popular industry standard and proprietary formats. The industry standard supported formats are STEP and IGES; supported proprietary formats are CATA V4 and V5, Creo and ACIS. Parasolid Bodyshop is an SDK that repairs, optimizes and validates CAD data imported into Parasolid to maximize the success of downstream modeling operations.

JT Open Toolkit

The JT Open Toolkit enables read/write access to JT parts and assemblies. In addition to the geometry, it includes access to PMI and attributes such as materials and lighting, properties metadata, and precise Parasolid XT B-Rep geometry. The JT Open Toolkit writes JT data that can be accessed directly with DISW products as well as all major CAD applications that support JT.

CAD/CAM/CAE OEM

Solid Edge OEM

Solid Edge® OEM is a complete CAD/CAM/CAE solution. Customers use Solid Edge OEM to create and offer new customized private-labeled CAD/CAM/CAE applications. Solid Edge OEM provides a range of powerful capabilities, including a complete set of tools for part and sheet metal design, assembly modeling and 2D drafting. The market-leading synchronous technology of Solid Edge delivers a unique advantage to original equipment manufacturers (OEMs).

Conclusion

DISW's PLM Components provide robust industry-leading functionality and are easily integrated in a fraction of the time it would take to develop, test and debug the functionality on your own. This reduces overall development time and cost and substantially shortens overall time-to-market for new software applications. In addition, because PLM Components provide extensive core capabilities, using them enables your team to focus on adding innovative differentiating functionalities that add value and uniqueness to your product.

Most toolkits do not have development license fees. License fees begin when your product is commercially available; until then, only maintenance fees are required. Fees are typically based on a percentage of net revenue and are designed to be cost effective. We understand the importance of the business agreement and work with our customers to create mutually beneficial partnerships that enable revenue growth and profitability.

For more information, please contact: component_sales.plm@siemens.com
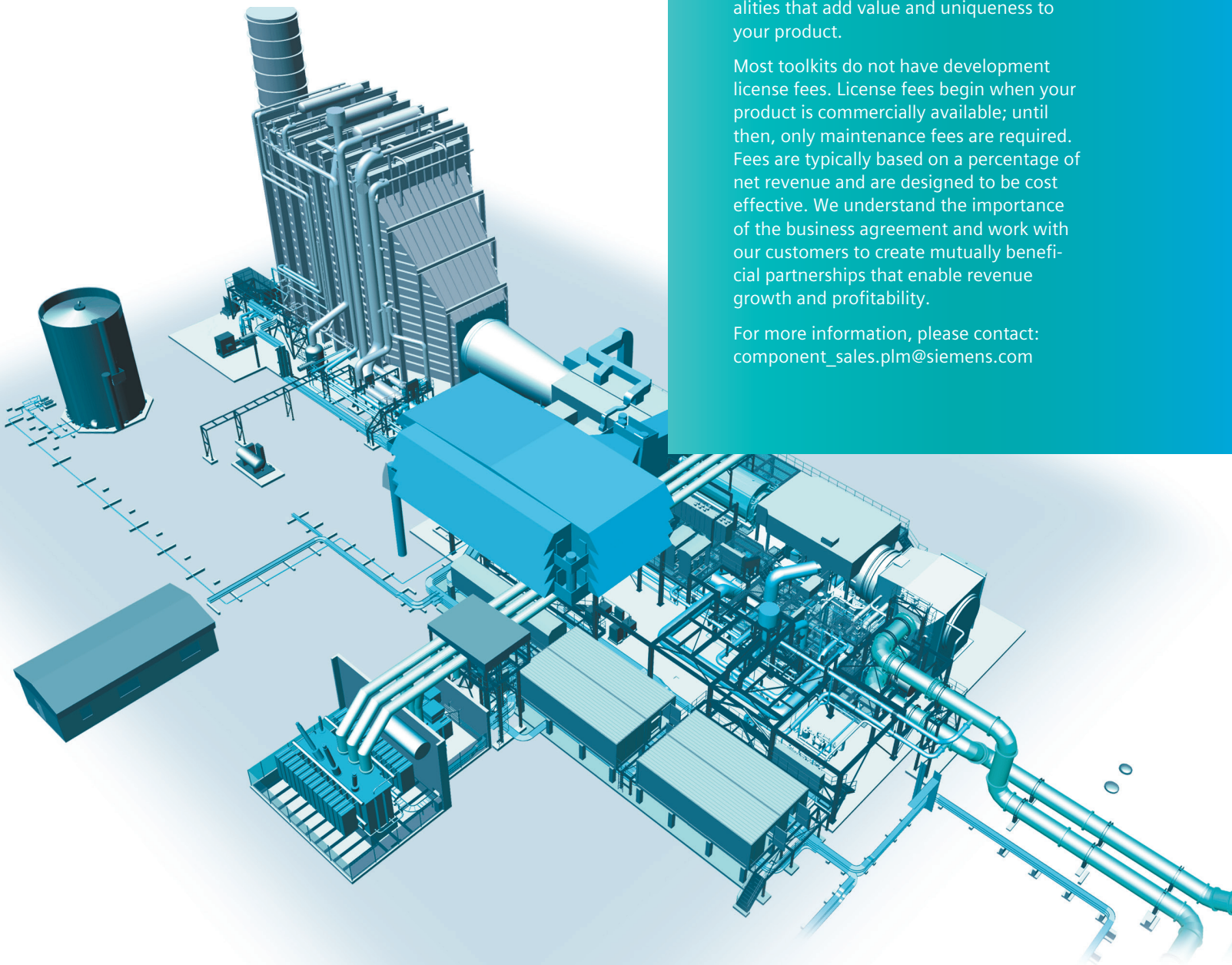
About Siemens Digital Industries Software
Siemens Digital Industries Software is driving transformation to enable a digital enterprise where engineering, manufacturing and electronics design meet tomorrow. Our solutions help companies of all sizes create and leverage digital twins that provide organizations with new insights, opportunities and levels of automation to drive innovation. For more information on Siemens Digital Industries Software products and services, visit siemens.com/software or follow us on LinkedIn, Twitter, Facebook and Instagram. Siemens Digital Industries Software – Where today meets tomorrow.

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