PDMbridge®: Bridging the Gap Between ECAD and PDM

CIMdata Commentary

Electronic Design Automation (EDA) is a special domain where only the most seasoned Electrical Computer-Aided Design (ECAD) experts reside—at least that's what many electrical engineers would say. Perhaps there is some truth to this statement. An electrical engineer's need for vast libraries of components, specialized systems analysis functionality, and the inherent complexities related to the combination of electrical, software, and hardware components have all made their job increasingly complex and challenging. For many of today's ECAD experts these challenges represent a fact of their day-to-day work life. The rapid emergence of products that are comprised of electronics, mechanical, and software components has placed many of today's ECAD experts in the forefront of product development and this means providing them with tools that increase their connectivity to enterprise processes and data is more important than ever.

Product Lifecycle Management (PLM), which has traditionally been used to handle information and processes associated with mechanical design must now, more than ever, prove itself to be an effective tool in managing mechatronic designs (i.e., the synergistic combination of mechanical engineering, electronic engineering, and software engineering) and their associated development technologies (e.g., ECAD, MCAD, CASE, CAE, etc.). The growing recognition of the importance of managing this complex environment is leading companies to expand their view of PLM to include the management of electronic designs and components as well as the software executed on those components. To support this need, a number of the leading EDA solution suppliers have developed and delivered product data management (PDM) capabilities that not only manage their EDA environment but also provide an integration point to an organization's overall PLM environment. Additionally, some of the comprehensive PLM solution suppliers offer products that support full product data management (incorporating software and electronics into the product definition). Finally, it is important to note that even some of the focused PLM solution suppliers, like Productivity Engineering GmbH, have defined and brought to the market technology-based solutions that bridge the gap that exists between EDA tools, data and processes, and an organization's PLM environment.

Productivity Engineering, which is based in the southern German town of Herrenberg, began as an engineering design house specializing in the design of digital circuits. For years they have been best known by many within the electronics industry as experts in the design of application-specific (ASIC) and field-programmable (FPGA) circuit design. The PDMbridge, one of Productivity Engineering's business units, has gained great expertise in the support of various EDA integration requirements over the years. This experience has helped Productivity Engineering gain a great appreciation of the difficulties and nuances related to the management and sharing of EDA-related data (e.g., material records, BOM structures, associated documentation, etc.) with its clients and their product-related data management environments since the late 90's. In turn, this has lead them to the recognition that the integration of an organization's EDA environment to its data management solution can offer significant benefits, especially those related to a gain in efficiency and reduction of cost within the context of an organization's electronic design related processes and operations. Productivity Engineering allows an organization to take advantage of the experience it has gained through the

implementation of its PDMbridge software solution—a focused-PLM solution that provides a robust link between many of today's leading ECAD and PDM systems.

Productivity Engineering's PDMbridge solution has been designed to span the process and data management gap that often exists between ECAD and PDM. Productivity Engineering reports that it developed PDMbridge with the following objectives in mind:

- Enable a uniform data resource for components, parts lists, and ECAD-related documentation so that an electrical engineer has access to a single source of product-related data.
- Allow information to be maintained and updated centrally and synchronized via linked systems so that overhead related to keeping data resources up-to-date is minimized.
- Deliver an easy-to-use, task-based interface for data access and exchange where all required data is quickly and easily available, thereby streamlining product data management processes.
- Enable a process-centric integration between the electrical engineers' development environment and the enterprise's PDM solution so that the organization's overall development process efficiency will increase.

As mentioned above, the PDMbridge solution provides companies with a sound link between their ECAD systems and their PLM environment's PDM system. This link has been designed by Productivity Engineering to allow ECAD users to take full advantage of specialty tools while providing an environment where they can continue to use product knowledge to transform designs and associated data into information that can be managed and leveraged by their organization's PDM system. This integration approach should eliminate data re-entry errors and guarantee the transfer of data between the integrated systems in a clear, concise, and valid manner. During the transformation process, the data being transferred is formatted by the PDMbridge solution in a transparent and unambiguous manner, and communication via the available interfaces is bi-directional.

PDMbridge's ECAD to PDM link manages those processes which make it possible to assign part (i.e., material) numbers for new materials in the PDM system and to transfer parts lists. This capability is handled by PDMbridge's BOM Management module. The PDMbridge solution supports this process by automating a number of critical tasks, including the verification by the PDM system that all the parts on a parts list generated by the ECAD system are available and approved for use. If these conditions are not satisfied, the parts list is rejected by the PDM system. If these conditions are satisfied, the PDMbridge automatically updates the part list in the PDM system.

At its core, PDMbridge provides a fairly extensive set of BOM management capabilities. Its BOM Editor provides electrical engineers with a rich set of BOM creation and structuring tools that can be easily customized to support an organization's specific and perhaps unique requirements. The structuring tools are highly configurable and support the rule-based transformation of BOM structures created in ECAD, the addition of non-modeled parts, etc. prior to the structure being transferred to PDM thereby providing a BOM workspace highly tailored and optimized for electrical engineers. Additionally, the BOM Editor provides the capability to cache BOM structures for later access and the ability of trigger certain PDM processes needed for synchronization (e.g., part creation and approval processes). Fundamentally, PDMbridge's BOM Editor is a flexible work-in-process BOM management module that provides the interface between ECAD and PDM thereby bridging the gap that often exists between the ECAD users, and an organization's enterprise PDM system and its BOM management capabilities.

In support of PDM to ECAD system data transfer and processes, PDMbridge's Component Management module is responsible for bi-directionally synchronizing the data records and classification information between the PDM system and the ECAD system. Additionally, component attributes managed by the PDM system are integrated into the ECAD library. This makes all material record data from the PDM system available (i.e., visible) to the ECAD user. The ECAD system user can therefore ensure that all parts used in a design are included as a material master record managed within the PDM system. Productivity Engineering sees the handling of physical library data, e.g., Footprints, Symbols, etc. as another essential element of the Component Management module. They have gained a significant amount of experience in this area during enterprise customer projects throughout the last few years.

PDMbridge also offers the Document Management module. This module can be used either as a publishing tool for ECAD designs or as a tool supporting hierarchical work-in-process (WIP) design structures. Individual handling of schematic and layout data, as well as intellectual property block handling, is also one of the benefits of the Document Management module—satisfying the need for global collaboration between the various stakeholders. PDMbridge can be configured to handle various kinds of ECAD-related derived data that can be stored and managed by the organization's PDM system and associated with the appropriate part records. The documentation can later be retrieved and special data records can be defined, e.g., for printed circuit board production, assembly, etc. Additionally, PDMbridge provides capabilities that support the scheduling of data synchronization (e.g., overnight batching of jobs).

PDMbridge has been designed with an open and flexible architecture, making it easy to integrate with ECAD and PDM Systems. Currently, PDMbridge supports standard integrations between a number of ECAD tools (e.g., Mentor Graphics Board Station, Expedition and Pads, Cadence Allegro, and Zuken CR5000) and PLM enabling solutions, namely SAP's PLM solution and Dassault Systèmes' ENOVIA SmarTeam solutions. Additionally, Productivity Engineering reports that PDMbridge's architecture has been designed to easily integrate other ECAD and PDM systems.

With PDMbridge, Productivity Engineering has clearly addressed many of the critical issues that must be solved when integrating ECAD and PDM. The tool offers a solid data and process management approach that is flexible for today's rapidly-changing development environments. Productivity Engineering's PDMbridge enables a fairly unique approach to ECAD to PDM integration that should prove to be valuable to organizations that require it.

About CIMdata

CIMdata, a leading independent worldwide firm, provides strategic consulting to maximize an enterprise's ability to design and deliver innovative products and services through the application of Product Lifecycle Management (PLM) solutions. Since its founding more than 25 years ago, CIMdata has delivered world-class knowledge, expertise, and best-practice methods on PLM solutions. These solutions incorporate both business processes and a wide-ranging set of PLM enabling technologies. CIMdata also offers research, subscription-based services, publications, and educational services.

To learn more about CIMdata's services, visit our website at www.CIMdata.com or contact CIMdata at: 3909 Research Park Drive, Ann Arbor, MI 48108, USA. Tel: +1 (734) 668-9922. Fax: +1 (734) 668-1957; or at Siriusdreef 17-27, 2132 WT Hoofddorp, The Netherlands. Tel: +31 (0)23 568-9385. Fax: +31 (0)23 568-9111.