COMMENTARY

Siemens Designcenter: SaaS-Based and Scalable MCAD

From startups to big business: MCAD flexibility for all

Takeaways

Using multiple CAD solutions to develop 3D product definition is common across industries but can slow innovation and silo optimization processes.

The Designcenter suite comprises four scalable configurations: Designcenter NX and Designcenter X NX, as well as Designcenter Solid Edge and Designcenter X Solid Edge. Designcenter has access to more than 140 integrated product components (e.g., Weld Assistant, Structure Designer, and Mechatronics Concept designer) via value-based token licensing.

Designcenter X NX design solutions, including the recently renamed Designcenter X NX Essentials (formerly Zel X), are offered as a cloud-based Software as a Service (SaaS) that can be installed as a desktop application or streamed in a browser tab. They ensure 100% compatibility with Designcenter NX and Designcenter X NX through a common data model, alongside interoperability with Solid Edge.

Designcenter X NX Design Essentials creates and edits designs for typical parts, assemblies, and drawings using the same technology stack as the rest of the Designcenter portfolio, all within a browser tab from the cloud.

Introduction

MultiCAD is a reality in many companies resulting from mergers and acquisitions, supply chain requirements, and/or trying to expand CAD access at a lower cost. MultiCAD cost reduction strategies began in the 1990s and early 2000s when a new class of CAD software known as "mid-range CAD" emerged with the premise that it offered 80% of the capability for 20% of the price of traditional (aka "high end") CAD solutions. For companies new to 3D CAD, mid-range CAD was a low-cost entry point, for companies focused on increasing access at lower license cost, mid-range CAD did not consider the total cost. Hidden costs include data translation, process complexity, lack of efficiency provided by process-specific tools found in high-end CAD, and data loss.[1]

Over time, the traditional CAD solution providers such as Dassault Systèmes, PTC, and Siemens acquired startups and set up new product lines to address the fast-growing mid-range market. Siemens acquired Solid Edge, Dassault Systèmes acquired SOLIDWORKS, and PTC acquired several companies, most

[1] Research for this paper was partially supported by Siemens

recently Onshape. The mid-range products were positioned to address different markets, and interoperability was commonly limited to using standards-based translators, such as STEP AP203. While 3D geometry and basic assembly structures could be exchanged, advanced capabilities such as parametric relationships, associative drawings, and 3D form features could not. The different lineages of the software and their underlying data models and algorithms made direct compatibility impossible but had the side benefit of avoiding significant cannibalization of the CAD suppliers' high-end products.

More recent downsides of a multiCAD strategy include collaboration issues and lack of digital thread continuity. During design, modern interoperability technology enables the incorporation of foreign solid models into an assembly; however, they are often treated as 3D blobs and cannot be modified. This works fine when the foreign models are static, but if they are changing rapidly during innovation and optimization processes, then the complexity of translation slows these processes down with extra steps and potential data loss.

In the context of a digital thread, simulation, CAM, and other software tools that reference or leverage the 3D model from non-native solutions require more complex data management and interoperability tools and processes. An obvious solution is for companies to stick with a single suite when possible although this strategy has it own set of problems such as higher license cost. While mixing best of breed tools such as mid-range and high-end CAD solutions adds complexity it does deliver user flexibility and lower license costs. Of course, there are many situations where best-of-breed is the only rational choice, but companies need to conduct a proper ROI analysis to make an informed decision.

Designcenter and X NX Essentials

Designcenter is Siemens' new suite for its mechanical CAD (MCAD) products. The "X" indicates that a product is available via cloud-based SaaS delivery. This suite includes Designcenter X Solid Edge and Designcenter X NX. Siemens has developed unique interoperability technology that supports many competitive solutions and Designcenter X Solid Edge. You can read about them in these CIMdata publications: commentary[2] and white paper[3]; however, note that product names have changed since these papers were written. The new names are:

- Designcenter NX *was* NX
- Designcenter X NX *was* NX X
- Designcenter Solid Edge *was* Solid Edge
- Designcenter X Solid Edge *was* Solid Edge X
- Designcenter X NX Essentials *was* Zel X

The NX family of solutions is well known for supporting the most complex designs and is the CAD tool behind many of today's well-known products. Designcenter continues these benefits. One of the advantages not usually top of mind that Siemens brings to the table is investment protection. The NX family of CAD software traces its lineage back to the late 1970s, and data created in those early versions only needs to be processed by one translation step into an early 1980s format. Still today, this 1980s format will open directly in the latest Designcenter NX and Designcenter X NX releases without data loss. This extreme protection of previously created data is vital to companies that have products, parts, and

[2] https://www.cimdata.com/en/resources/complimentary-reports-research/commentaries/item/26442-supercharge-digital-transformation-by-consolidating-cad-to-nx-commentary

[3] https://www.cimdata.com/en/news/item/26443-cimdata-publishes-white-paper-on-how-mcad-consolidation-can-improve-digital-transformation-results

modules that have long lifespans, such as A&D and machinery products. CIMdata expects Siemens to continue their data-forward compatibility long into the future.

Siemens has recently relaunched its entry-level product, Zel X, as Designcenter X NX Essentials. This is particularly important for companies with investments in the NX family of CAD solutions, as it provides a cost-effective way to expand access to the power of Designcenter X NX and the data stored in NX format. Designcenter X NX Essentials runs in a web browser from the cloud, eliminating the need for high-powered CAD workstations and local app installs. It supports view and markup as well as data creation and editing. It can create and edit feature-based solid models and assemblies, model sheet metal parts, produce Product Manufacturing Information (PMI), create drawings, develop 2.5-axis CAM programs and hole making, execute basic simulation, and interoperate with competitor CAD solutions, including CATIA, Creo, and SOLIDWORKS.

Web-based CAD data editing is also available in the Designcenter X NX Standard, Advanced, and Premium configurations, enabling users to access their designs remotely or on the go. To augment the capabilities of the NX packages, Siemens uses a token-based licensing system known as value-based licensing (VBL) that enables users to access over 140 shareable extra cost capabilities.

	Designcenter X NX Essentials	Designcenter X NX Standard	Designcenter X NX Advanced	Designcenter X NX Premium
Data Management				
Base level data management	X	X	X	X
Add-hoc online guest sharing	X	X	X	X
Teamcenter Integration		X	X	X
Design Modeling				
Web Editing	X	X	X	X
Solid & Feature Modeling	X	X	X	X
Synchronous Technology	X	X	X	X
Drafting	X	X	X	X
Assemblies	X	X	X	X
Core Convergent Modeling		X	X	X
Freeform Modeling Basic		X	X	X
User Defined Features			X	X
Freeform Modeling Advanced				X
Advanced Assemblies		VBL	VBL	X
WAVE Control		VBL	VBL	X
Advanced Convergent Modeling		VBL	VBL	VBL
Process-specific Modeling				
Sheet Metal Design	X	X	X	X
PMI	X	VBL	X	X
Routing Base		VBL	X	X
Flexible PCB Design			X	X
Routing Advanced		VBL	VBL	VBL
Structure Design	X			
Validation				
Molded Part Validation		X	X	X
HD3D Visual Reporting OOTB Reports		X	X	X
Product Validation (Check Mate Runtime)		VBL	X	X
HD3D Visual Reporting Custom Report Editing		VBL	VBL	X
AI-enabled Design				
Optimization Wizard			X	X
Select Similar Faces		VBL	VBL	X
Show/Hide Similar		VBL	VBL	X
Advanced Surface Analysis				X
Smart Selection				X
Design Copilot		VBL	VBL	VBL
Immersive Design				
Dynamic Rendering (Visualize Shape)		X	X	X
Static Photorealistic Rendering		VBL	X	X
Immersive design tools		VBL	VBL	VBL
Translators				
Translators (DXF, STEP, IGES, JT, etc)	X	X	X	X
Basic CAM				
2.5 axis milling	X			
Hole making	X			

Figure 1: Designcenter NX Family of Solutions Capabilities

VBL enables companies to optimize their license expense, by allowing capability access to be shared among users as needed, when they require it, reducing license cost and administration when compared to the common named user approach.

Enabling non-traditional users to access 3D data expands the use of the data, extracting more value from the primary product design and allowing more decisions to be based on this high-value data. It also extends the digital thread, speeding up processes, while improving data quality and traceability. Furthermore, Designcenter and Designcenter X are part of the Siemens Xcelerator portfolio that includes Teamcenter and Simcenter, supporting the digital backbone and advanced simulation required to develop modern products at scale. NX Essentials and web editing leverage Teamcenter Share to support remote access, ensuring that digital thread integrity is preserved.

Designcenter X Q&A

1. What happens in Designcenter X NX Essentials when an advanced feature, such as freeform modeling, is encountered?
   - The freeform (or other) feature is view-only and cannot be directly edited. However, if an underlying object, such as a sketch, is edited, the freeform feature associated with that sketch will update.
2. How does Cloud-based SaaS support work with a Browser?
   - Designcenter X NX Essentials and web editing run natively in a web browser and use Teamcenter Share to access data.
3. What parts of Designcenter X can I load on my computer?
   - Designcenter X NX Standard, Advanced, and Premium are all available on the desktop with cloud data management, licensing, and deployment. There is also a streaming option available for Standard, Advanced and Premium. It is called Designcenter X NX Remote Add-On.
4. What are the Designcenter data management options?
   - Designcenter X NX Essentials uses Teamcenter Share to interface with Teamcenter.
   - Designcenter and Designcenter X NX Standard, Advanced, and Premium have full access to Teamcenter and Teamcenter X and can also run in the native operating system or integrate with non-Siemens PLM solutions.

Conclusion

While many companies use multiple CAD solutions to define their products, this is not a best practice, as it slows innovation and optimization processes, presents data translation and migration problems, and adds complexity to the digital thread, which can break in a multi-CAD environment. The license cost of providing access to non-traditional users often prevents companies from consolidating onto a single CAD platform.

Designcenter X from Siemens now offers Designcenter X NX Essentials, a new low-cost entry point to the NX family of CAD solutions, providing a cost-effective consolidation opportunity for multi-CAD environments that include SOLIDWORKS, Inventor, and other CAD offerings. Designcenter NX Essentials is 100% compatible with NX data and is delivered via a web browser from the cloud, simplifying access and administration. In addition to modeling and drafting support, it also supports basic CAM, simulation, and interoperability at a competitive price, making it attractive to startups and NX users looking to expand access to non-traditional users. Teamcenter Share provides data management for Designcenter X NX Essentials. Designcenter and Designcenter X NX Standard, Advanced, and Premium have access to Teamcenter and Teamcenter X for data management. Startups seeking a low-cost entry point to advanced 3D CAD that can scale with their needs, and NX-based companies looking to expand their digital threads,

should consider evaluating the latest Designcenter offerings and Designcenter X NX Essentials, as they provide flexible ways to create and expand a digital thread.

About CIMdata

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