

Simplifying Product Design in a Complex World

Today's design-anywhere, build-anywhere environment requires speed, agility, control and visibility. Access to 3D graphics applications in the cloud from any location answers the call.

Product design engineering has moved far beyond the confines of ever more powerful workstations. Companies can't afford to restrict projects to using only local talent. Many are linking engineering teams around the globe to take advantage of skills in different geographies, ensure they are cost-competitive, and collaborating more closely with customers and partners to bring the right products to market.

The director of IT at a multibillion dollar global electronics manufacturer says, "time-to-deliver and being competitive on a global level are our two biggest challenges. How fast can we get a product to the market from the inception of the thought, through this whole process?" But, he notes, "This specific part of our operational expense is huge," and reducing costs is a high priority.

Managing the Product Lifecycle

Traditional product development often results in sprawling, costly and inefficient IT infrastructure and frustration over poorly managed information. Increasingly, companies across industries ranging from automobiles to electronics to power generation are turning to more disciplined product lifecycle management (PLM) to manage products from design, through manufacturing and even to disposal.

PLM is greatly simplified by centralization of data and compute services. This protects the organization's intellectual property and enables cost-effective "follow the sun" utilization of hardware resources by teams based around the world, from Asia to Europe to the United States. Companies can integrate development work with suppliers and customers. They are also increasingly leveraging advanced 3D graphics applications to reduce prototyping costs and speed time-to-market.

For many, a key initial driver is the need to tap widely dispersed talent pools. A development engineer at a major automobile manufacturer says that one of his top challenges is finding the right skills. "You just can't grab a design guy out of school and have him pull all the pieces out of the database and model it."

Just as important is concern over business continuity and disaster recovery—how to avoid the pitfalls that befell many Japanese manufacturers in the wake of the earthquake and tsunami of 2011. Throughout the country, operations that were otherwise undamaged were nonetheless idle because of the inability to access facilities located in the disaster zone.

But network bandwidth restrictions and latency pose challenges to centralization. Ensuring security of the data and protection of intellectual property is a major concern when remote devices are provided access. The chief engineer at an aerospace company says, "Industrial espionage is rampant" and "we experience attacks from friendly countries as well; they are trying to figure out what we are doing."

3D Graphics Whenever, Wherever

In the connected world of product design, there are increasing demands to free up access to design drawings, so concept and design can be reconciled on the shop floor, out in the field or even in the service bay of your local auto service facility.

"We're also now seeing—particularly with devices like the iPad and Android-type tablets—that people are able to collaborate anywhere in world with any partner," says Tom Kilkenny, general manager of aerospace and defense for IBM, which is collaborating with desktop virtualization



VIDEO: Tom Kilkenny, General Manager, IBM's Global Aerospace and Defense Industry division, discusses today's megatrends affecting industrial sector companies as they address global marketplaces, including unique security concerns, the explosion of mobile devices, and the virtualization of 3D engineering applications.



VIDEO: Watch Gordon Payne, Senior Vice President and General Manager, Desktop and Cloud Division, Citrix, share how Citrix and IBM are helping leading-edge customers deliver 3D applications remotely, allowing them to centralize design data securely, enable "workshifting" for designers, and deliver improved performance, higher security and reduced costs.

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— JEFF NEDWICK
IBM market segment
manager for PLM

leader Citrix to deliver high-performance graphics applications to mobile and remote devices.

Kilkenny adds that tablets make it possible for improved collaboration, so a product engineer can bring the complex design drawings to the shop floor to confer with the manufacturing engineer, for example. With desktop virtualization, he says, "To the end user, rendered 3D images don't look any different than if they were running on a high-end workstation."

Derek Thorslund, director of product management with Citrix, says many challenges had to be overcome to deliver high-performance graphics such as 3D visualization in a virtualized manner that centralizes and secures data, while providing remote access. "Delivering a good user experience, especially when connecting over a wide area network from one country to another, was the first big challenge that Citrix focused on overcoming with our HDX 3D Pro technologies."

The aerospace engineer emphasized the problems with doing things the old way. "Computational fluid dynamics (CFD) tools create enormous data sets and have very large grids. If you're running that on a remote facility, when you're talking about shipping literally tens to hundreds of gigabytes of data back and forth there's obviously a security issue." And he adds, "We all know that the longer the pipe gets, the slower it gets. If you want that long pipe to be fast too, the more expensive the pipe gets to own."

Meeting the Challenge: Desktop Virtualization

Teaming virtualized graphics applications and data with cloud technology dramatically impacts the tradeoffs between centralization and remote performance, while protecting data on central servers behind a corporate firewall, says Jeff Nedwick, IBM market segment manager for PLM.

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In 2009, Citrix enhanced its XenDesktop virtualization solution with HDX—High Definition User Experience—a set of capabilities that delivers a high-definition desktop virtualization experience to end users for any application, device or network. Responding to the needs of large industry clients, Citrix introduced HDX 3D Pro to provide high-end applications over LAN and WAN connections.

Typically, graphics applications such as 3D visualization are OpenGL- or DirectX-based graphics applications that require hardware acceleration via a dedicated graphics processor (GPU). With HDX 3D, these applications can be used productively starting with a WAN bandwidth of less than 1.5 Mbits per user—much less than other available products. Citrix technology also supports large geographical distances and round-trip latency of up to 200 milliseconds.

Nedwick says the devastation resulting from the Japanese earthquake and tsunami was a major driver in IBM's decision to partner with Citrix to offer a more flexible product design infrastructure incorporating XenDesktop with HDX 3D Pro: "The near meltdown of the reactor and the ever expanding quarantine zone encompassed engineering offices of some manufacturers and their key suppliers, making it difficult to access engineering data that was sitting on workstations and preventing quick set up of alternative engineering sites."

New Era of 3D Remote Visualization

Today's design-anywhere, build-anywhere environment requires speed, agility, control and visibility across the design ecosystem. But it can't come at the expense of security and protection of intellectual property.

3D remote visualization can help companies achieve time-to-market goals by empowering workers with remote access to hosted graphics applications from anywhere and experience high frame rates even over low bandwidth Internet connections using thin client workstations or tablets. And it can play a key role in disaster recovery and business continuity. ■

To find out more about the partnership between IBM and Citrix, including collateral and product scalability guides, please visit <http://www-935.ibm.com/services/us/en/it-services/citrix.html> and www.citrix.com/ibm



Gordon Payne

SENIOR VICE PRESIDENT
AND GENERAL MANAGER,
DESKTOP AND CLOUD DIVISION,
CITRIX

Payne of Citrix oversees the company's strategy for virtualization, networking and cloud products as senior vice president and general manager of the company's Desktop and Cloud Division. He engages with a wide range of customers, partners and the Citrix product teams building the new model for IT-as-a-service. He has worked closely with large clients developing tools and products in the aerospace, auto and oil and gas industries to apply virtualization to the demanding needs of 3D graphics applications. In a recent interview, he discusses the needs of industry clients, current trends and future directions.

Virtualization Transforms the World of Product Design

What challenges have you had to overcome to apply virtualization to 3D visualization?

This has really been a partnership with some very large, early-adopter customers. Citrix has been working for two decades on centralizing applications and delivering them as a service. Customers who have done large deployments for knowledge workers came to us, asking if we could push the envelope and do that for 3D graphics applications. In the 3D professional graphics space, users demand very high performance and high image quality. 3D models in CAD/CAM and medical imaging typically can have hundreds of thousands or millions of vertices, so at the back end you need hardware resources including acceleration from powerful graphics cards to render these models with great performance.

What are the unique benefits that the collaboration between Citrix and IBM delivers to industrial companies?

IBM's leadership in data center blade system technologies, combined with the virtualization experience of Citrix, means that we can implement solutions with the performance necessary to satisfy the needs of engineers and designers. IBM has a long history working with many customers with 3D professional graphics, and that knowledge is invaluable.

There's been a lot of talk about the consumerization of IT. How is that impacting the heavier industries such as auto, aerospace and electronics?

Wireless and mobile devices are making engineering models and other 3D data more accessible. Tablets are having a transformative effect on every industry because they are lightweight and portable, but also have high resolution screens that make them suitable for pulling up design drawings on the shop floor or out in the field on an oil rig. These high-performance displays are just natural for consumption of 3D graphics applications, especially combined with 4G networks, and it's changing the way engineers and designers access 3D models.

What priorities do customers have that Citrix is looking to fulfill in the near term—and where is this technology heading?

Customers need to leverage a global workforce, but when subcontracting to workers overseas, intellectual property protection is top-of-mind. Desktop and application virtualization neatly solves that problem by keeping all drawings, cost models, and bills-of-materials safe in the private cloud data center. Enabling employees to work from anywhere is also a top priority for forward-thinking companies who are

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Citrix pioneered new hypervisor technology that supports multiple graphics cards per blade. We also partnered closely with NVIDIA to interface directly with the graphics cards via proprietary APIs, so we can deliver a very responsive user experience. We implemented advanced codec technologies to deliver a high frame rate, even to workers on relatively narrow and unreliable WAN connections.

making disaster preparedness a core part of their IT service delivery model. Looking ahead, we're working to keep driving down costs by increasing server scalability and reducing endpoint requirements. And we're relentless in optimizing performance so that the complete user experience of desktop virtualization is better than what users have been accustomed when chained to local graphics workstations. ■

VIEWPOINT



Tom Kilkenny

GENERAL MANAGER
IBM'S GLOBAL AEROSPACE AND
DEFENSE INDUSTRY DIVISION

Kilkenny is general manager of IBM's Global Aerospace and Defense Industry division. Previously, he was vice president of the Global Industrial Sector, Server and Technology and was earlier vice president of Product Life Cycle management, where he was responsible for IBM Dassault application software as well as the related hardware, software and services. He recently discussed customer challenges and how IBM is working with Citrix to deliver advanced solutions.

Disruptive IT Transforming Engineering

What are the foremost challenges that IBM's industrial customers are struggling with when it comes to product development?

The megatrend is the complexity. One dimension is globalization and the emerging business models associated with global design, designing and building anywhere and working with design partners around the world.

Another dimension is the complexity of the products themselves. Products that were mostly physically oriented, for example braking systems in cars, which formerly were primarily physical functions are now brake by wire, and are now software-driven, electro-mechanical driven. Being able to manage all that complexity and simulate the product before it goes into their customers' hands is a big challenge.

Will disruptive technologies such as cloud have as much of an impact on these companies as those in other market segments?

There is not a customer I know of in aerospace and defense and I would argue in any industry sector that is not looking at how cloud will enable and address some of their challenges. Cloud for nongraphics-intensive applications is a different technical problem than for graphics-intensive. So the work IBM and Citrix are doing together to virtualize 3D engineering graphics has matured and emerged to the point where clients are moving out of pilots and into production.

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How much impact is mobile technology having in traditional engineering environment?

Many of the companies have design offices in Asia, Europe, and in the U.S., and when they need to physically collocate they have a more portable IT infrastructure so they can access the same applications and the same data on more portable devices from an engineer-to-engineer perspective.

One other transformation that this technology is allowing is for field service organizations to be able to access the engineering data. If you were to walk into service bays for automobiles you'll definitely see more computers on the floor, more tablet devices on the floor that allow access back to configuration information; you'll see maintenance instructions that are derived from the engineering information. So you're seeing the extension of this notion from design to manufacturing and now to service.

What issues and challenges does IT face with the immense volumes of product design data that are being generated?

Part of our engineering cloud solutions is the storage element. There's a storage cloud that will store not just the 3D data but also all the software data, because as much as 3D data is propagating, the software lines of code are propagating at even higher orders of magnitude.

Now that designs are done digitally and in 3D, they need to be maintained for the lifecycle of these assets. Long-term data preservation is something that is top-of-mind as in, "How do I maintain the integrity and the intent of the 3D digital data for many, many years?" In some cases in aerospace that can be 50-plus years. ■