Workstations, CAD, and the Cloud

By Kathleen Maher, Jon Peddie Research

Workstation vendors are looking up into the Cloud and wondering if they feel a storm coming on. The workstation business, as we frequently tell you in our Market Watch reports and our Workstation Report, is a good business. Workstations command a higher margin, they bestow a halo effect on a company’s product line, and they are a requirement in several market segments including CAD, Professional Video/Post, 3D modeling and animation, financial, oil and gas exploration, simulation, etc. But, are they an imperiled business, is it possible, conceivable, that we might one day be able to leverage the power in the cloud when we need it and the rest of the time work happily on a low cost, lightweight platform? There’s certainly talk in that direction.

Lately, CAD applications and Games are charging into the cloud to join the other applications that have been up there for a while, including database applications from Oracle and Salesforce, office tools from Microsoft and Google, storage, email, rendering, etc.

Games and CAD are applications that can benefit greatly from seamless collaboration and the cloud can offer that. Yet both are graphics heavy applications that would seem to demand client-based hardware acceleration. Ironically, all the work that has been done to enable great graphics performance on computers given bandwidth restrictions translates to the cloud. It doesn’t happen tomorrow, but the people working in these fields have been overcoming hardware restrictions from the very start so moving to the cloud is just another challenge. A look at how the CAD companies are experimenting is a pretty good start.

Autodesk’s cloud projects
Autodesk’s Project Butterfly has just come out of its cocoon in the form of AutoCAD WS an online version of AutoCAD that can be accessed online on computers, phones, and iPads. It was introduced along with the new AutoCAD for the Mac. In addition to Project Butterfly, the company has a multitude of Cloud initiatives going on including Project Dragonfly, a 2D and 2.5D project for interior designers, Project Cumulus for MoldFlow acceleration, Project Centaur for mechanical design tasks, and there is the much higher profile Project Twitch, work that puts Inventor, Revit, and Maya in the Cloud for customers. Project Twitch is so named because it takes advantage of OnLive streaming game technology. The idea behind Project Twitch is to put the hard work of processing up in the Cloud and to compress the graphics sending only what has changed down to the client. So someday, you can run any software on just about any client -- Inventor on a netbook, Maya on an iPad. Autodesk is toying with the idea that there are customers who would prefer to use some products as a utility that they can turn on and off as needed.

AutoCAD WS does not use the same technology as Project Twitch and it is not trying to accomplish the same thing. Rather, the idea is to access AutoCAD and your content in the cloud where you can collaborate and update drawings, but it’s not a heavy duty CAD tool. It works more like Google Docs. It’s available online and users can collaborate.
AutoCAD everywhere. Autodesk has released AutoCAD WS along with AutoCAD for the Mac. The company says they expect to see tools like the iPad and the iPhone come into play for collaboration.

Addressing a major hesitation for customers investigating the usefulness of the cloud, Autodesk has standardized on SSL encryption. The company notes that the use of SSL will ensure security even when users are using a public wireless network.

Project Butterfly is the result of Autodesk’s acquisition of PlanPlatform, an Israeli company that developed a web based DWG viewing and editing tool called VisualTao. Autodesk acquired the company in 2009 for a reported $20-30 million.

**CAD competitors in the cloud**

At first glance, CAD in the Cloud doesn't seem to make a lot of sense given the heavier footprint of most CAD products, and it never hurts to remember the lessons of history. Way back in the ancient mists of time, the X Window-based thin client model was thought to be a brilliant application for CAD users. It would foster collaboration and document management at a time, the early-nineties, when there were few good options.

The CAD community brutally and unmercifully murdered the scheme. Sacrifice performance and add another layer of management? At the time it seemed like an idea only a clueless-IT specialist could like. What about security?

There are similarities today. CAD users are no more interested in compromising on performance now than they were almost 20 years ago. They're still concerned about security. And, most of all they worry about ceding control to a centralized entity. In the Cloud's favor is rapidly improving bandwidth technologies, the ability to allow a wide range of users to access the same material at the same time from within a company, outside the company, and anywhere in the world. Today,
CAD users are much more comfortable with collaborating and dealing with data management overhead. Cranky engineers who did not like the idea of someone "looking over their shoulder," now appreciate the ability to work collaboratively on large projects and to problem-solve visually with others. Likewise, independent architects are recognizing the value of more sophisticated communication with contractors and construction teams. Important battles have been fought and won and they've made the idea of cloud computing more palatable to CAD workers.

CAD vendors including Autodesk and Dassault are taking the long view, seeing opportunities for CAD as a utility that can be sold by use depending on the application. For every CAD user there is a galaxy of users who could benefit from access to the data. If they don't want to pay for a full license of a CAD product, they might be happy to pay as they go. AutoCAD WS gives Autodesk a tool to combat Dassault's DraftSight, a 2D CAD product developed by German company Graebert. The cloud bestows a new level of spontaneity that CAD development has lacked because it had to roll out new versions to an entrenched user base and support a web of third party developers. Now, people can try out new tools at their own risk and they can tell the developers what works, what doesn’t and why.

Dassault subsidiary SolidWorks is also beavering away on a Cloud implementation. The company demonstrated SolidWorks running on a Mac thanks to a Cloud based implementation at the start of the year at the SolidWorks 2010 user conference. The company introduced SolidWorks Connect, its cloud-based collaboration tool using Dassault's Enovia online infrastructure. SolidWorks plans to roll out SolidWorks Connect to alpha customers in the fall and to mainstream customers in early 2011.

SolidWorks sees the Cloud as an opportunity to extend new features to users as well as to enhance collaboration. SolidWorks executives also talk about the Cloud as a resource for widely distributed CAD teams. Any global worker would be delighted to reduce the need for midnight conference calls. The ability to directly access work and accompanying documents online would go a long way to doing that. And again, there are those people working on the data management side, that may need only review work done and make light edits and comments.

Distance is a promise and distance is a limitation. Right now, the early trials are limited by distance to reduce lag times, which will raise the ire of vigilant users already looking for a reason to take a pass on the Cloud. The Autodesk projects are being gradually rolled out across the United States. The situation is similar, by the way, for the OnLive game site and gamers are every bit as, ahem, twitchy about performance.

**The infrastructure**

Companies may change and hardware configurations definitely change, but technologies continue. While it may seem as if there is suddenly a bunch of hubbub about cloud computing and SaaS (software as a service) the building blocks have been laid over the decades. Just because CAD engineers rejected remote compute schemes years ago doesn't mean that the work didn't continue. The great workstation/server companies of the past, Sun, SGI, IBM, Digital, are the companies who built the technologies that are enabling the Cloud today.
The growth of the Internet has created monster server farms all over the country, Amazon, Google, and others have recognized that in the process of building out their services, they've built a backbone for other companies as well. CloudSwitch is a company headed by former SolidWorks CEO John McEleney. They are building a service that enables companies to easily take advantage of cloud computing with the flip of a switch. Amazon and VMWare key partners for CloudSwitch. The free demo from CloudSwitch invites users to upload a VMWare virtual machine to CloudSwitch's Amazon EC2 Cloud to see how it works. VMWare of course, is a tool that is now enabling CAD users to run their Windows based applications on Mac machines. In other words, run it here or run it there. CloudSwitch describes its software as a software appliance for cloud applications.

On another front, mental images has built the RealityServer platform to enable remote access to 3D data. RealityServer takes advantage of NVIDIA’s powerful graphics and Tesla systems to accelerate graphics performance in the cloud. It's shown most often as a resource for rendering, allowing architects to showcase a design or for industrial designers to share ideas. But the company is also working with partners to enable design review and collaboration. Access can be provided to a variety of clients in addition to PCs. This summer Penguin Computing has introduced its Penguin on Demand (POD) service that makes Linux clusters available to customers on a monthly basis. One of the first services announced by Penguin is a relationship with mental images that will make RealityServer services available on POD clusters.

Dassault is especially interested in the idea of CAD in the cloud to complement its ambitions for linking PLM with visual data and letting the visual drive the data. It's a networked based application by definition and that means-- certain requirements for accessibility and scrutiny being met -- it's a logical cloud application. PTC President James Heppelman told investors on the company's call in April that there are already Windchill services available in the Cloud, but he doesn't necessarily see it as a requirement for CAD at the moment. And, he noted that he sees customers taking a very cautious approach to PLM in the Cloud. As he said of Windchill and similar products, "this is an application that runs on a server and whether that server is in your data center or up in somebody else's being run for you and delivered as a service -- what the technology does and the business advantage that it brings to you is what's most important."

As for CAD, Heppelman said, "I don't think SolidWorks is going to go on any big growth spurt because they're putting apps in the Cloud. I just don't feel like the Cloud has proven itself in many industries, quite frankly." And the other major gear in the CAD/PLM universe, Siemens, has remained pretty reticent on the subject.

**What's the problem being solved**

Heppelman, hit the nail on the head when he said, the important question to ask is what advantage does the Cloud give you? From the vendors point of view taking advantage of Cloud computing gives vendors a chance to offer advanced capabilities to customers on a trial basis. Autodesk is very interested in the idea of offering rendering and analysis in the Cloud -- tasks that only get better with more processors. Right now, they're asking their customers to give these applications more of a try. Letting people get an easy taste of products may help sell more copies of 3ds Max, Moldflow, and Inventor. Better yet, more users adopting rendering and analysis means opportunities for new, more specialized products.
Collaboration, as mentioned, is an obvious opportunity for CAD vendors. The Cloud has the potential to enable smaller companies to build collaborative systems or perhaps to tap into larger systems. For instance, a Cloud-based service can connect the satellite of contractors around any large architectural project from the smallest to the largest.

As CloudSwitch VP Ellen Rubin lays it out on the company blog, it's not a matter of all or nothing. Rather, she says, applications are "tiered into categories of workloads ..." The Cloud offers a new opportunity to access a much broader range of resources that can be "fit against the needs of business. In some cases, the current IT infrastructure is over-provisioning and under-delivering production gear for lower-importance/usage apps; in other cases it's woefully under-delivering."

JPR's last report put the number of CAD users at 13 million worldwide. These are people working on licensed copies of CAD software on computers. Frankly, none of those people are moving to the Cloud in the next 3 years. The question is, will they murder CAD in the cloud just as it's being born? As Heppelman notes, few of PTC's customers have shown interest in accessing PLM data in the cloud, so it's even more unlikely they'll embrace CAD in the Cloud until there is absolutely no performance hit and security concerns are adequately addressed.

And, what of the people who are now arguably "over provisioned," as Rubin suggests, because the majority of their work is on the side of data management, review, project management, etc. They could well opt for accessing data on the cloud via more convenient or more preferred machines like Macs, netbooks, iPads, and so on. This is a tiny proportion of CAD seats though it also includes adjacent seats -- workers who have need of accessing CAD files.

It’s always important to remember that nothing happens real fast in the world of professional applications and workstations – there’s a lot of infrastructure to deal with. In the end, CAD in the cloud is not going to displace a major number of workstations for the next 5 years, and probably 10 years, but make no mistake, these new dynamics that are just now working themselves out, are going to change the world of computing forever. For now, the Cloud and CAD will primarily be used for testing introducing new software, adding capabilities like rendering, analysis, and collaboration. It’s even conceivable that cloud based applications will become a powerful force multiplier for workstation apps enabling users to offload resource hungry tasks while they get on with their work. Yet, the inexorable pace of change will continue. iPads and devices like them will let people return to the drawing board. Heavy duty, complex workstation based applications will become more modular and lightweight to allow people to get work done wherever they are using the proper tool for the situation. So, yeah, we aren’t seeing the end, and we aren’t seeing the beginning of the end, but we’re seeing the beginning of something very new in computing.

About Jon Peddie Research
Dr. Jon Peddie has been active in the graphics and multimedia fields for more than 30 years. Jon Peddie Research is a technically oriented multimedia and graphics research and consulting firm. Based in Tiburon, California, JPR provides consulting, research, and other specialized services to technology companies in a variety of fields including graphics development, multimedia for professional applications and consumer electronics, high-end computing, and Internet-access
product development. Jon Peddie's Market Watch and First Look are quarterly reports focused on the market activity of PC graphics controllers for notebook and desktop computing.

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