Topic:
MCAD

Peer-to-Peer technology and its relevance to computer aided technology markets

Interview with Jon Zimmerman of the Symbiant Group

In the manufacturing world, applications using peer-to-peer (p2p) architecture are already being implemented to decrease the cost and time involved in the design and production process. However, any newcomers to p2p who scan the IT press on this topic can face a confusing picture. It's either the next big thing, or the next turkey; it can seem to be all things to all people; and isn't it all about sharing music anyway?

iCAD is produced by Business Advantage, a B2B research, business development and marketing consulting practice operating in the global IT, Digital and Telecommunication s sectors.

To shed some light on the issue, we asked **Jon Zimmerman, CEO of the Symbiant Group**, for his views on what p2p is, and why it is relevant to computer aided technology developers/suppliers. John McEleney, VP of Product Marketing, The SolidWorks Corporation, also provides his thoughts on the relevance to the CAD/CAM industry industry.

The Symbiant Group is an IT services firm based in New York, specialising in the delivery of p2p business technology solutions. Symbiant Group focuses on the development of solutions for the Life Sciences, Financial, Industrial Design, Transportation and Aerospace/Defence sectors.

iCAD: Where has p2p computing come from?

Jon Zimmerman (JZ): "The p2p community is seeing this as the 3rd wave of Internet technology which will change the way we communicate, use and access information. As is frequently stated, many of the p2p technologies are not really new ideas. In fact the general concept actually has quite morbid origins. The predecessor to the Internet, called ARPANET, was designed to be a p2p architecture so that if any of the nodes on the network did not survive a nuclear attack, the remaining peers would be able to continue communicating and working due to the non-centralized nature of it.

iCAD: p2p was defined recently by Ovum in a Computer Weekly article as follows: "p2p computing focuses on computers being able to establish a direct connection with each other, which enables the sharing of data and system resources with minimal involvement of centrally managed servers. For an application to be considered as p2p in its purest sense, two primary conditions must be satisfied:
1. The application must be designed to accommodate dynamic network connectivity patterns and temporary network addresses
2. Peers must be able to operate with a significant level of autonomy (that is, minimal involvement of centralised resources, such as servers)."

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We can look at the development of the Internet in waves that have changed the way we work and communicate through our computers:

- The **first wave** would be the introduction of the TCP/IP protocol and email;

- The **second wave** would be the introduction of the web browser, which allowed users to view and navigate data on the Internet visually.
- The **third wave** of Internet technology - p2p - is going to change the way we communicate and work online into a more natural form. p2p also promises to make the connection of heterogeneous networks of computers and other peripherals more transparent and easy. Rather than communicating with others through a centralized network environment, we will communicate and meet with our friends and colleagues in a more direct manner. Hardware will be able to "call out" for various services using new protocols and standards and receive replies from other "peer" nodes without needing to interpret data through a centralized network."

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iCAD: So what does the term p2p actually cover?

JZ: "The name p2p is an umbrella name for the three main groupings of technology that fall under it. These three distinct ideas can be completely "pure" p2p plays or some kind of hybrid between p2p and client-server.

1. **Distributed Computing** has its roots in parallel/cluster computing. The big idea here is that users can now bundle various machines that are connected on a LAN or the Internet to create a cost efficient computing environment with processing power which could rival many state-of-the-art supercomputers. Although generally based on a client/server model, as data is sent from a central broker/scheduler server to any number of client machines, it is considered a p2p environment as it is composed of client machines that are working together in a peer fashion on a problem. In some distributed computing environments, the clients actually are able to execute remote procedure calls (RPC) to another peer or resource.

Find out what John McEleney, VP of Product Marketing, The SolidWorks Corporation, thinks about the implications of p2p for the CAD industry.

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2. **Collaborative Computing** is about allowing disparate users to communicate directly in a "real-time" fashion. Instant Messaging is the best example of this. Rather then sending a message through a centralized mail server and then waiting for a reply, users can communicate directly to a user through their instant messaging application. A technical advantage of this model is that you can communicate directly with someone else's machine (unlike email which is sent first to a mail server at the destination and then forwarded to the correct local address), and there is no need to worry about the status of a centralized system. If both peers can reach the Internet (through dialup, LAN, Wireless, etc.), then they can reach each other. Another big plus for this technology is presence detection, which allows you to know if the person, resource or file that you are looking for is online and available.
3. **Distributed File Sharing** is about moving information away from a centralized file storage system and back to the edges of the network where it was created. In a centralized system, if I search for and find a document on a centralized server, I have no idea whether there is a more updated version on someone's machine that just hasn't been uploaded yet. In a distributed file-sharing environment I would search and find the document on the creator's desktop, knowing that the file is up-to-date. This also takes stress off the network as data transfer moves between peers on the edges of the network."

iCAD: Where is p2p particularly relevant to the computer aided technology supplier community?

JZ: "I'll break this down to the three sub-groupings described above:

Distributed Computing is a no-brainer. By allowing a user to leverage the inherent computing power on nearby desktop PCs or offsite resource pools, we are given the ability to off-load computational heavy problems from the local machine into an environment that can reach the processing power of a supercomputer quite economically (due to the fact that the other PCs are already purchased). Although many CAD/CAM applications/environments include similar parallel processing options, this technology is very relevant as it creates a "level playing field" for many users. One doesn't need access to "heavy iron" so to speak, only a pool of relatively cheap desktop PCs that are easy to set up into a distributed environment. As an example, if one wants to simulate the various characteristics of how air moves around an object and the friction that is generated, access to a supercomputer would enable results to be generated quickly. In the real world though, many engineers simply don't have this facility available. With distributed computing technology, a customer who may only have access to a pool of desktop PCs can work on similar problem in a reasonable amount of time, if not in real time.

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To give a further example, we are implementing this type of technology for a client's application that helps simulate the release of radiation from a linear accelerator to develop the dosage treatment for radiation therapy for cancer.

Integrating or bundling this type of technology creates new competitive features for developers and makes a package more desirable. For every seat of CAD software sold to a large customer there are probably 40 copies sold to smaller engineering shops. To be able to provide these other 40 customers with the opportunity to develop with the power of the larger customer economically is a huge selling point. The ability to provide any customer with the opportunity of supercomputing power by utilizing inherent resources with little outlay of new capital is always a big selling point.

Collaborative computing environments are poised to help create more efficiency in many computer-working environments. If CAD/CAM/CAE programs were to be developed to run through the windowpane of a collaborative environment, projects could be worked on, and managed in real time with little need for complex back end integration. Presently, if you want to work on an object, show it to a product manager, an outside supplier or contractor, and a potential end-user simultaneously in a secure environment, it is practically impossible. Within a p2p environment, partners in a project only require a peer client application on their desktop to view and participate in a collaborative environment. Integration between the users is straightforward as the only configuration needed is handing out the Internet address of each user's computer. The clients would be pre-configured to do the rest. The potential for cost-savings and time to market is huge. I must add that most of these collaborative products also include functionality that allows for the granting of rights and permissions to individuals or groups by an administrator to maintain control of a production process.

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Distributed File Sharing environments will increase the possibility that a file being used is actually the most current one. How many times has an out of date CAD file been sent off to a manufacturer because the current file can't be found or accessed, or no one is aware of it? The implications of being able to allow outside collaborators and manufacturers access to a current file in a secure way is a big plus. Here again there is functionality to grant rights and privileges to users."

iCAD: How else can this technology help gain/maintain customers and increase revenue?

JZ: "p2p is going to be relevant to a lot of vendors/suppliers from both the product sales side as well as the customer acquisition and retention side of things. Apart from the direct customer benefits of providing p2p environments that work side by side with CAD/CAM/CAE applications, there is a host of other opportunities where this technology could be leveraged. One major emerging use of p2p collaborative environments is online instruction. Imagine a customer being able to select the "help" function in an application that could trigger the p2p application to open a collaborative work area for the product that may include other distant users or an instructor. From the training angle, you could do a walk through of a project, allow for questions in a chat window, as well as provide file access through the file sharing aspect all in real time. You could perhaps allow your customers to direct classes aimed at your other customers. This helps bolster the community aspect that many vendors try to develop around their products. One could also imagine a branded model library that works in a fashion similar to Napster where users are able to trade model or property files amongst themselves.

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We are currently helping several clients to reap the benefits of p2p technology through easing and increasing communication throughout their enterprises. For instance, software developers can take advantage of the distributed processing to speed up the time it takes to compile a new version of software to be ready for QA. Collaborative technologies can assist sales and marketing departments to communicate with project managers and the shipping department."

*i*CAD: Where is this technology taking us?

JZ: "This might sound a little utopian, but p2p is actually taking us to a new paradigm in computing where high performance and collaborative computing will be pervasive: The GRID. This is not a new fad in computing, it's just the next evolutionary step until the technology industry gets to this scenario of pervasive computing, where you will not need a big computer sitting under your desk and will not have to buy a whole application suite for one type of task. Computers will all be on and connected online. Although this might frighten some of the OEMs and ISVs out there initially, I think as they begin to change their product offerings and design their applications to be used and purchased on a "as used" basis, they will begin to see the benefits of this evolution in technology.

This technology evolution is also taking us to a form of computing where we will interact with our associates in a more "natural" fashion rather than having to rewrite how we work based on some software solution that is programmed to a particular paradigm. By implementing a solution where the peer clients are able to speak with each other fluently on install, we will find that passing secure data back and forth will become commonplace and allow us to work with our outside partners in a more seamless way. Imagine a scenario where an aircraft manufacturer is developing a simulation of its latest aircraft. With a p2p environment, they would be able to add in variables from an engine manufacturer's latest top-secret engine such as thrust, weight, and fuel consumption without the need to compromise either party's proprietary design data. An engineer for the aircraft manufacturer could request more thrust with the same fuel consumption from the engineer designing the engine fan blades. With a few adjustments, the engine model would be able to be redesigned in real time and begin sending simulation data back to the airplane manufacturer who could then re-asses fuel loads or fuselage shape to achieve the correct design."

Have you read what John McEleney, VP of Product Marketing, The SolidWorks Corporation, thinks about the implications of p2p for the CAD industry?

SolidWorks

Many thanks to Jon Zimmerman for his co-operation with this article. For companies interested in learning more about p2p technologies, staff at the Symbiant Group are available for consultation, and to assist in finding and implementing p2p solutions for their internal working environment or product suite. Symbiant currently represent about a dozen p2p software manufacturers, and are familiar with the products of about two-dozen others. Jon Zimmerman can be contacted at 230 E.25th Street, Suite 5C, New York, NY 10010 USA. Telephone + 1 212 252 0845; email jon@symbiantgroup.com

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