

# **CAD 2.0**

**Finally a Solution to the CAD  
Interoperability Problem**

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**SYCODE**  
software made simple

## The Problem

It is a well known fact that CAD software vendors use their proprietary file formats to lock users into using their software. Parametric solid modeling systems make it impossible for their solid models to be worked upon in another parametric system without losing parametric information. They cannot even save to an earlier version of their own software. Users wanting to achieve interoperability between two parametric modeling systems can do so only using neutral file formats such as IGES, STEP, SAT, etc. wherein the solid models come in as dumb solids, making it impossible to edit the parametric features of such models. And this is a big problem. A problem which CAD vendors seem to agree is best left unresolved.

*“3D parametric solid modeling systems make it impossible for their solid models to be worked upon in another 3D parametric system without losing parametric information”*

## The Solution

The solution to the problem is not a new parametric modeling capable neutral file format. Even if such a file format was created, it is doubtful that the CAD vendors would ever adopt such a format for the fear of solving the problem. Surprisingly, the solution has come in the form of a whole new modeling technique, something we at SYCODE refer to as CAD 2.0, the CAD equivalent of Web 2.0. In other words, the next generation of CAD software. This is the modeling technique employed by SpaceClaim Professional 2007, an innovative CAD software developed by SpaceClaim Corporation ([www.spaceclaim.com](http://www.spaceclaim.com)). You may wonder how a modeling technique can solve a data interoperability problem. Actually it's quite simple. Please do read on.

*“The solution has come in the form of a whole new modeling technique”*

## The Modeling Technique

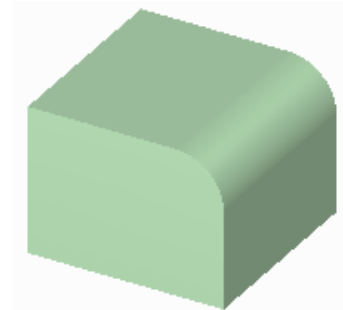
The modeling technique is unique in the sense is that it takes a dumb solid model and quickly recognizes its features. Thereafter, intuitive editing tools give you the power of parametric modeling without the hassle of a

feature tree. For example, if you want to change the radius of a fillet, select the curved face that makes up the fillet and pull it to increase or decrease the radius. Doing the same thing in a conventional parametric modeler would be impossible because the fillet face is as dumb as the original dumb solid. Similarly, if you want to increase the diameter of a hole, simply select the cylindrical face that describes the hole and pull it outwards. Or if you want to move the hole to a different location, select the cylindrical face and move it.

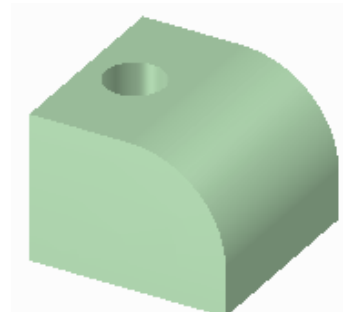
Ok, so what does this fancy modeling technique have to do with the data interoperability problem? Well, everything. If you can do “parametric” modeling on a dumb solid, then an IGES, STEP or SAT file is as good as the original proprietary file created by a parametric modeler. Any solid modeling system, worth being called one, should be able to import and export to one or all of these neutral formats.

In such a CAD 2.0 world, proprietary formats, even if they exist, will not matter much. Although data exchange across different systems occurs through neutral formats alone, it will be as if both the sending and receiving systems recognize each other’s parametric data, because both CAD 2.0 systems recognize the features automatically when loading the models. For example, say you create a box in one CAD 2.0 system, apply a fillet and save the model as a SAT file. Then you import the SAT file into another CAD 2.0 system, change the fillet radius, add a hole feature and save it back as a SAT file. Thereafter you import this modified SAT file back in the first CAD 2.0 system and you will be able to edit the hole and fillet as if they both were created in the first system. Your model has actually done a round trip but it seems as if it was modeled entirely in the first CAD 2.0 system.

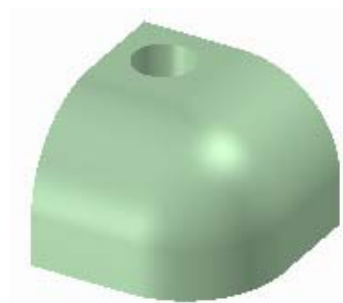
***Bottom line, if you cannot experience a loss in parametric data then the problem is solved. It’s really that simple!***



*Fillet in the first CAD 2.0 system*



*Increased fillet radius, added hole in second CAD 2.0 system*



*Moved hole to corner, added fillets in first CAD 2.0 system*

## The Future

In recent years, the focus has moved from modeling to modeling easily, quickly and efficiently. Nowadays, designers are getting so entangled in issues like parametrics, constraints, file formats, software versions and upgrades, that they sometimes lose focus on the job at hand. Basically, a designer simply wants to create a 3D watertight solid model which can be easily modified by him or someone he chooses, using any CAD software, any version and at anytime in the future. A CAD 2.0 system offers exactly that!

A CAD 2.0 system user is free from the headaches that come with conventional parametric modeling systems and can spend his time doing what he should be doing - designing, not doing book-keeping of parameters, relationships and constraints in a feature tree or wondering whether another user will be able to modify or even view his model in another software, or even in an earlier version of the same software that he is using.

Moreover, proprietary file formats no longer tie down the user of a CAD 2.0 system. He is free to move to any other CAD 2.0 system at any time and he will be able to directly work with his models right from day one. He is not forced to use the same software as others he is collaborating with, and neither does he need to bother what software others are using.

So does this mean that conventional parametric modeling systems are on their way out? Not really. However, as new versions are rolled out, they are going to be made friendlier to neutral formats. When importing dumb solids parametric modeling systems will recognize features and automatically update the feature tree. When that happens they will effectively become CAD 2.0 systems. Their proprietary formats will lose relevance, apart from storing non-geometric data such as textures, annotations, etc.

It is unlikely that conventional parametric modeling systems are going to ignore the winds of change and stay the way they are. A user of a conventional parametric

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modeling system can switch over to a CAD 2.0 system at short notice. All he needs to do is save his models in a neutral format and start working with them directly in the CAD 2.0 system. The fact that he will be able to model with greater ease, speed and efficiency will be an added bonus.

## About the Author

Deelip Menezes is the owner of SYCODE ([www.sycode.com](http://www.sycode.com)) based in Goa, India. He started writing CAD software way back in 1997 and hasn't yet stopped.

He specializes in developing plug-ins for many CAD systems including AutoCAD, Autodesk Inventor, Autodesk VIZ, 3ds Max, SolidWorks, Solid Edge, SpaceClaim, Alibre Design, Rhinoceros and IntelliCAD. Over the past few years he has accumulated tremendous experience in the field of CAD file formats and the internals of various CAD systems.

He has a degree in Mechanical engineering and worked as an AutoLISP programmer before starting his own software company. In his free time Deelip Menezes writes his thoughts on the CAD software industry on his blog at [www.deelip.com](http://www.deelip.com)