

## TEKTRONIX AND CLIOSOFT INTEGRATED WITH CADENCE

### CLIOSOFT'S SOS VIADFII HELPS STREAMLINE MIXED SIGNAL IC DEVELOPMENT PROCESS AT TEKTRONIX

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Brenda vanVeldhuisen  
Principal Engineer, Tektronix, Inc.

#### CORPORATE PROFILE

- A world leader in test, measurement, and monitoring equipment. Tektronix provides solutions to the communications, computer, and semiconductor industries.

#### DESIGN CHALLENGE

- Build a custom mixed signal IC using a completely new flow and a new set of tools.
- Need for concurrent development to meet time to market.
- Collaboration between a team of IC design engineers. Easy access to design data by Design Automation Team in order to debug issues.

#### CLIOSOFT SOLUTION

- Data management solution seamlessly integrated with the Cadence Virtuoso® Custom IC Design Platform.
- Support for tagging, branching and merging to facilitate concurrent development.
- Collaboration flags and intuitive GUI that provides high visibility into the project.

#### CADENCE INTERFACE

- Generic Data Management APIs and SKILL interface to enable the integration.
- Tools and support provided by the Cadence Connections program.

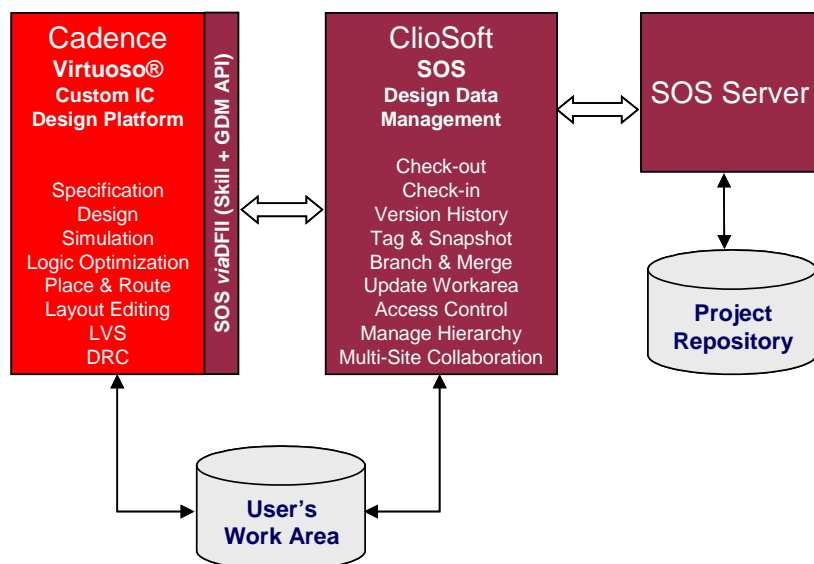
#### SELECTING A DM SOLUTION FOR A NEW TOOLSET AND FLOW

Tektronix uses a variety of in-house and commercial tools to assist in the design of high-performance mixed-signal ASICs. For a selected class of these designs, Cadence IC Custom tools was incorporated into the design process. To deploy this new flow and toolset, Tektronix had to select a design data management solution that works with the Cadence IC Custom design tools and was flexible enough to be integrated into the design flow, which included in-house tools. To minimize training and overhead, the data management solution had to be easy to administer and use. Tektronix selected a DM solution after a comprehensive evaluation process. "We chose ClioSoft's SOS viaDFII as the DM solution not only because it met the technical and usability requirements, but also because of the excellent technical support," said vanVeldhuisen.

#### SEAMLESS INTEGRATION & SIMPLE TO USE

All the common data management features are accessible directly from the Cadence Library Manager. Designers invoke data management operations usually from the Cadence tools.

"SOS viaDFII is very well-integrated with the Cadence toolset. It is simple, yet complete. Even designers who have never used version control were able to pick up the basics and become productive very quickly," remarked vanVeldhuisen. "It even automatically prompts for checkout when you want to edit a cellview."



The SOS GUI's collaboration icons and graphical display of version history give users ready-access to project status. "Engineers keep the SOS GUI open to get the additional visibility

into the project," observed vanVeldhuisen. Users can update their workarea when needed, to get the latest changes.

## STREAMLINING THE DESIGN FLOW

The design flow required the use of several in-house and Cadence tools. The Cadence tools were used for back-end design (Virtuoso® and Assura), and the physical design data was managed with SOS.

With several engineers working on the design at the different stages of the flow it is very important for members to communicate well and stay synchronized. SOS viaDFII provided easy synchronization between the different stages.

Each user sets up their own workarea so they have a stable and isolated environment. To make a change, an engineer must check out a cellview from the Library Manager or use the auto-checkout feature that automatically prompts them when they open a cellview for editing. A write-able copy of the cellview is placed in the workarea. The engineer can now work on this cellview without affecting anyone else and check in the cellview when the changes are completed.

Optimizing disk space usage and data management performance is a high priority for large projects. Therefore, all workareas are set up using the 'Symbolic links to SOS Smart Cache' method. In this model the SOS Smart Cache server keeps versions of files being used by all workareas in a local cache. Files in a workarea are created as symbolic links to the cache. The Smart Cache server tracks how many workareas are currently accessing each version of each file in the cache and automatically purges the version from the cache when it is no longer being used. This allows each user to have complete control over their workarea and yet share the common versions of files with other members of the project.

## ITERATIVE AND CONCURRENT DEVELOPMENT

Any IC design is the result of several iterations through the design flow. An efficient concurrent development methodology is paramount to meeting schedule deadlines. Tektronix used a combination of tags (symbolic labels for versions) and branches to achieve concurrency. SOS allows you to define a revision search rule based on tags and branches that determine which revisions of files are made available in your workarea. This allows the engineer running LVS to use the versions tagged 'golden' while the designer may be making changes to the latest version of the design.

Often, PDK (Process Design Kit) libraries require parallel modification. This is accomplished by using the branching and merging features of SOS viaDFII. PDK developers make changes on a branch and therefore, do not affect other engineers whose revision search rule does not include this branch. Once the PDK changes are verified, they can easily be merged back on the main line. "We requested ClioSoft to make the branch and merge capabilities available directly in the Cadence Library Manager. ClioSoft delivered on our request and this made concurrent PDK development a reality," noted vanVeldhuisen.

The SOS GUI uses a collaboration icon to flag unmerged branches. This ensures that all branches are eventually merged or terminated thereby avoiding any errors.

## AUTOMATING TASKS AND MANAGING SCRIPTS

The SOS command line interface can be invoked from within the Cadence environment (ipcBeginProcess) or through any type of shell (sh, csh, Perl) or Makefile and therefore, can be easily incorporated into Cadence customizations.

"Makefile, scripts and tool extensions such as SKILL code are an integral part of our Custom IC Design Flow," said vanVeldhuisen. "Therefore we manage these files in SOS as well. The project repositories have all the data and scripts needed to create the customized environment to manage the design flow for custom IC design."

## INTEGRATION WITH CADENCE TOOLS

SOS Data Management has been integrated with the Cadence tools using their Generic Data Management API. This provides a very tight integration with Cadence tools. Data management operations are directly available from the Library Manager. Users can operate on libraries, cells, and views without worrying about the underlying co-managed sets of files. Integration through GDM also enables features such as auto-checkout. If a user tries to edit a cellview using any Cadence editor, the user is automatically prompted to check out the cellview. This seamless integration results in a very easy-to-use system.

Advanced features such as branch/merge or DM operations on an entire design hierarchy are not supported by the GDM interface. Therefore, Cadence's powerful SKILL extension language was used to implement these features. The SKILL interface allowed ClioSoft the ability to expose advanced SOS features directly in the Cadence environment.

## RESULTS

The first project using ClioSoft's SOS viaDFII taped out in April/2004. It was a mixed signal IC with about 350,000 devices. The design used five libraries with over 500 unique cells and two process libraries.

"We adopted several new tools for this project and SOS viaDFII has been an unqualified success! Four other Custom ICs are now in the pipeline at Tektronix using SOS viaDFII for design data management."

Brenda vanVeldhuisen



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