



Raiders of the Locked Art: Opening the Treasure with Interoperable PDK's

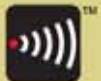
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Why Interoperability?

- Greater range of tools available
 - Allows selection of best in class tools
- Eases the transfer of data between tools
 - Same vendor and between different vendors
- Transportable IP
 - Reduces likelihood of IP block not supported in your tool flow.

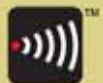
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Interoperability Expands your Tool Choices

- **While today's big EDA companies are stable, history tells us that EDA vendors are not around forever. Anyone remember Daisy Systems?**
 - Having interoperability could be vital to be able to move data.
- **GDSII format provides a rudimentary form of data transfer for layout data.**
 - Data is reliably moved between tools.
 - No concept of connectivity.
 - Any Pcell data is flattened, making modifications difficult.
- **Schematics are far less portable. The EDIF format was/is the most popular.**
 - EDIF never captured all of the information required to move a schematic from one platform to another.
 - I've had to convert Daisy schematics to Viewlogic Schematics, and later Viewlogic Schematics to Cadence Schematics. It was never easy.

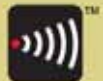
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Interoperability Expands your Tool Choices

- An interoperable PDK implies the availability of a wider range of tools.
- Allows you to pick the “Best in Class” tool for the job.
- OpenAccess provides the backbone for this.

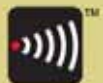
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Digital Flow – Custom Analog Flow

- For mixed signal designers, chips are not built in the Place and Route tool.
- This means data needs to be moved back and forth between the custom layout tool and the P/R tool.
 - For example creating outline and pin locations in the layout tool, and moving that data to P/R tool.
 - Moving the P/R data into the layout tool often means adding new Via definitions to the layout tools technology file; at worst a very risky proposition.
 - Changes! Did anyone say changes! Any ECO's can mean iterating the transfer of data between tools. Hopefully no translation errors!

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Digital Flow – Custom Analog Flow

- **OpenAccess solves the problem of moving data between tools.**
- **No translation errors.**
- **No time spent translating data.**
- **No disk space tied up in intermediate data formats.**
- **Lets you concentrate on the design, not data management.**

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Interoperability is important for IP

- **Digital is and has been portable for some time.**
 - Even so, movement of data between tools is via primitive formats (for example no connectivity information, i.e. GDSII).
- **Analog and RF IP potentially require more support.**
 - Schematics, different abstract view requirements.

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Schematics can be Portable!

- For most designs there is no reliable way to move Analog/RF schematics between tools. In general lots of homebrew scriptware.
- Even if I automatically translate the schematic, it may not be able to efficiently communicate it's function.
- Engineers like ordered schematics, simply preserving electrical information is not enough.
 - Understanding a circuits function is crucial to encouraging re-use.
- **Open Access gives us a path to portability.**

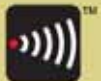
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IP comes from Many Sources

- IP can come from the large commercial companies like ARM, MIPS, Synopsys.
- More importantly you may contract to have special IP blocks designed by small independent contractors.
 - These contractors may often have tool sets different from what you are using.
 - Their tool flow may mean that you can't use their IP. Their IP may be best in class, but you cannot take advantage of that.
 - Interoperable PDK's let you integrate this data more intelligently and with less headaches.

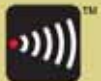
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There are efforts underway to Standardize PDK's

- **For PDK's**
 - The GSA Mixed-Signal/RF subcommittees PDK and Model checklists.
 - IPL – Interoperable PDK
- **For OpenAccess, SI2.**
- **For PyCells, IPL**
- **For Hard IP, the GSA's IP EcoSystem; and the IEEE.**
- **Get involved your input is always welcome!**

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Conclusion

- **Having an interoperable PDK lets you design chips faster, more reliably, and with less grief.**
- **OpenAccess will give us interoperable PDK's, and more importantly interoperable and portable IP.**
- **We're not there yet on PDK support, but getting closer. Maybe next year!**

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