

Voom Mower

Milkyway-OpenAccess Interoperability

Synopsys 15th EDA Interoperability
Developers Forum

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www.voom.net

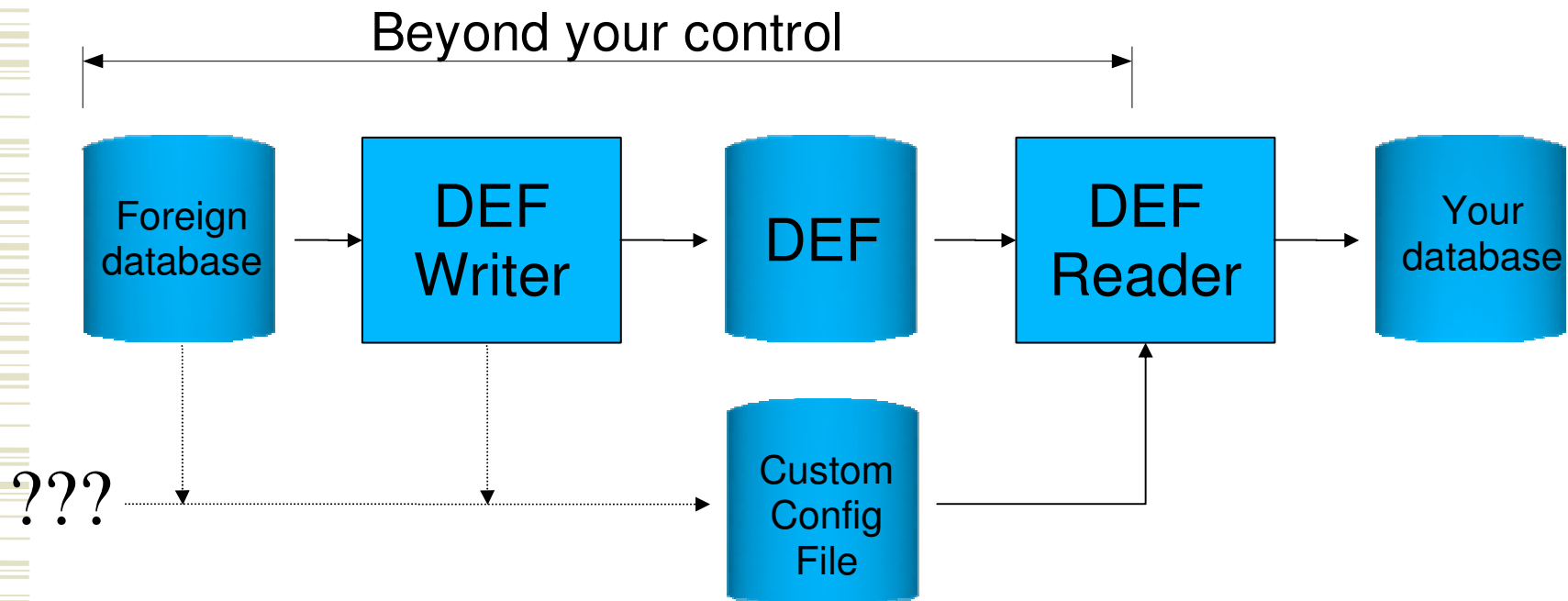


Text File Exchange Seems So Easy

- Virtually every other tool reads and writes the popular formats
- Readers and writers with APIs are available
- Familiar to most everyone
- Human readable (except GDSII)
- Editable (except GDSII)



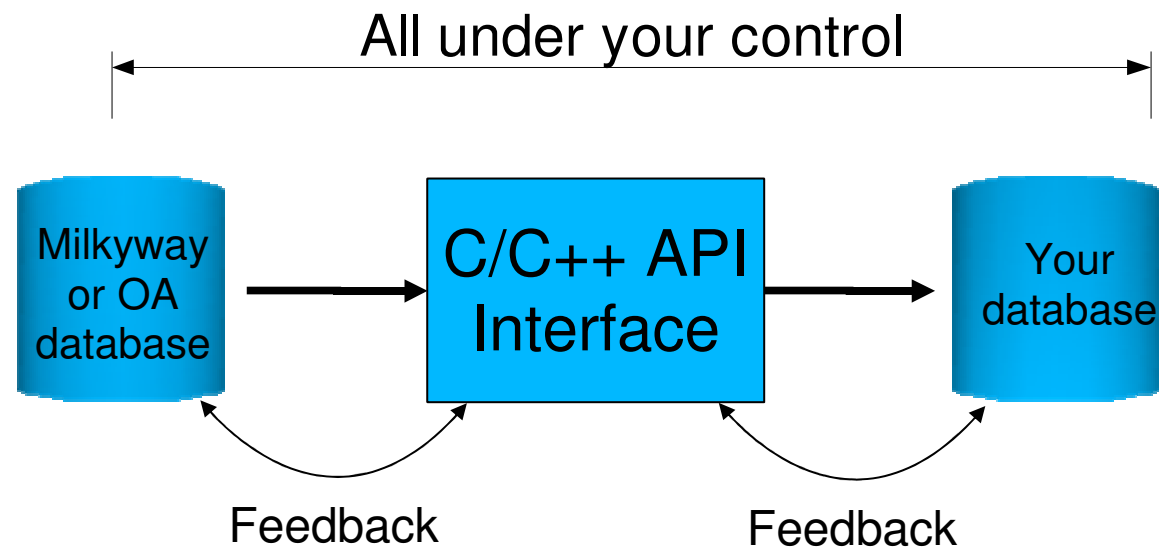
Complex File Exchange



- Poor control and visibility through two translations
- Big, slow, incompatible, flat
- Flow different every time



Simplified With API



- Single translation for entire hierarchy
- Complete control and visibility



Introducing Mower

- Bidirectional Milkyway-OpenAccess translator plus Astro tech file translator
- First application was DFM tool
- Mission: Drop-in solution for Milkyway flows
- Based on
 - Tapeout-proven DEF-based flow
 - Existing Voom code base
 - Milkyway and OpenAccess

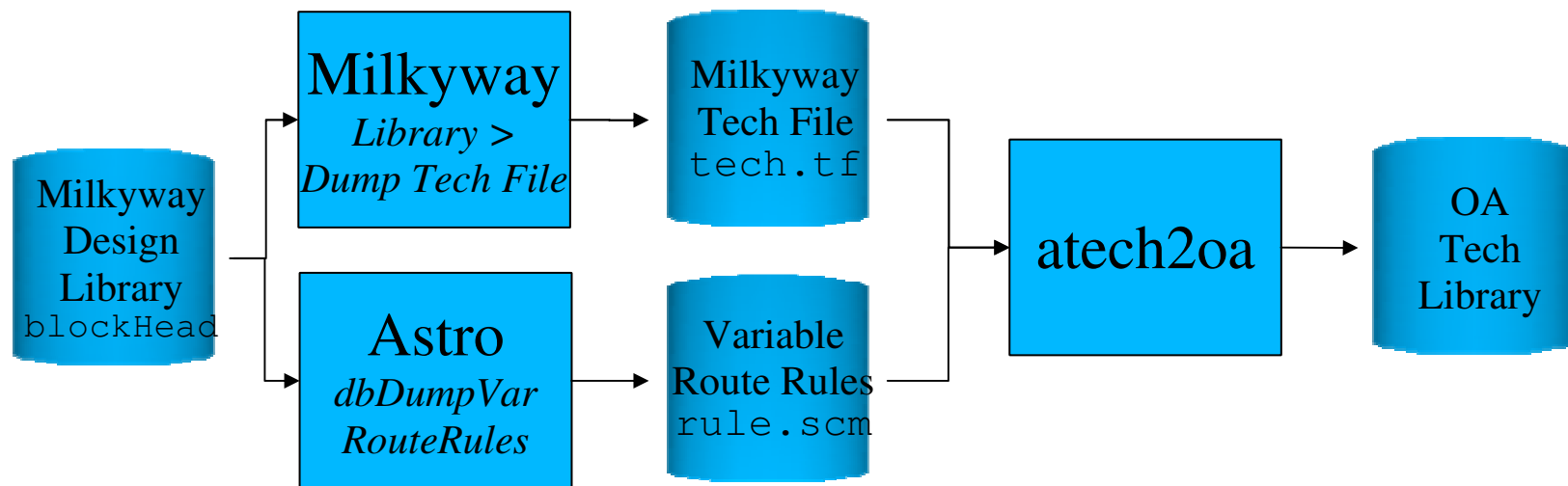


Design Principles

- Completely eliminate LEF, DEF, GDSII, Verilog
- Hierarchical, with identical library structure
- Automatic, minimal command options
- No configuration files
- Keep the user informed with over 600 messages



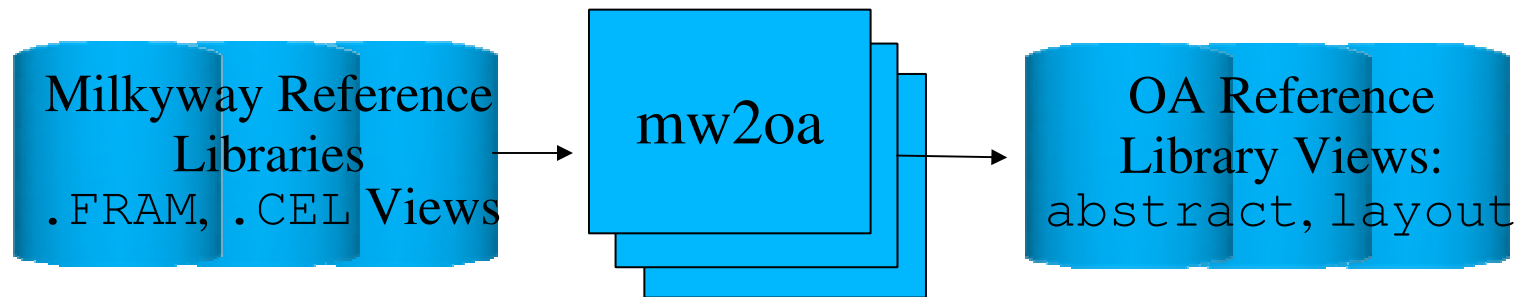
Tech Library Flow



- Using Astro,
 - Dump tech file with *Tech File > Write To File*
 - Dump variable routing rules with *dbDumpVarRouteRules*
- `atech2oa -tf tech.tf -scheme rule.scm -lib tLib`



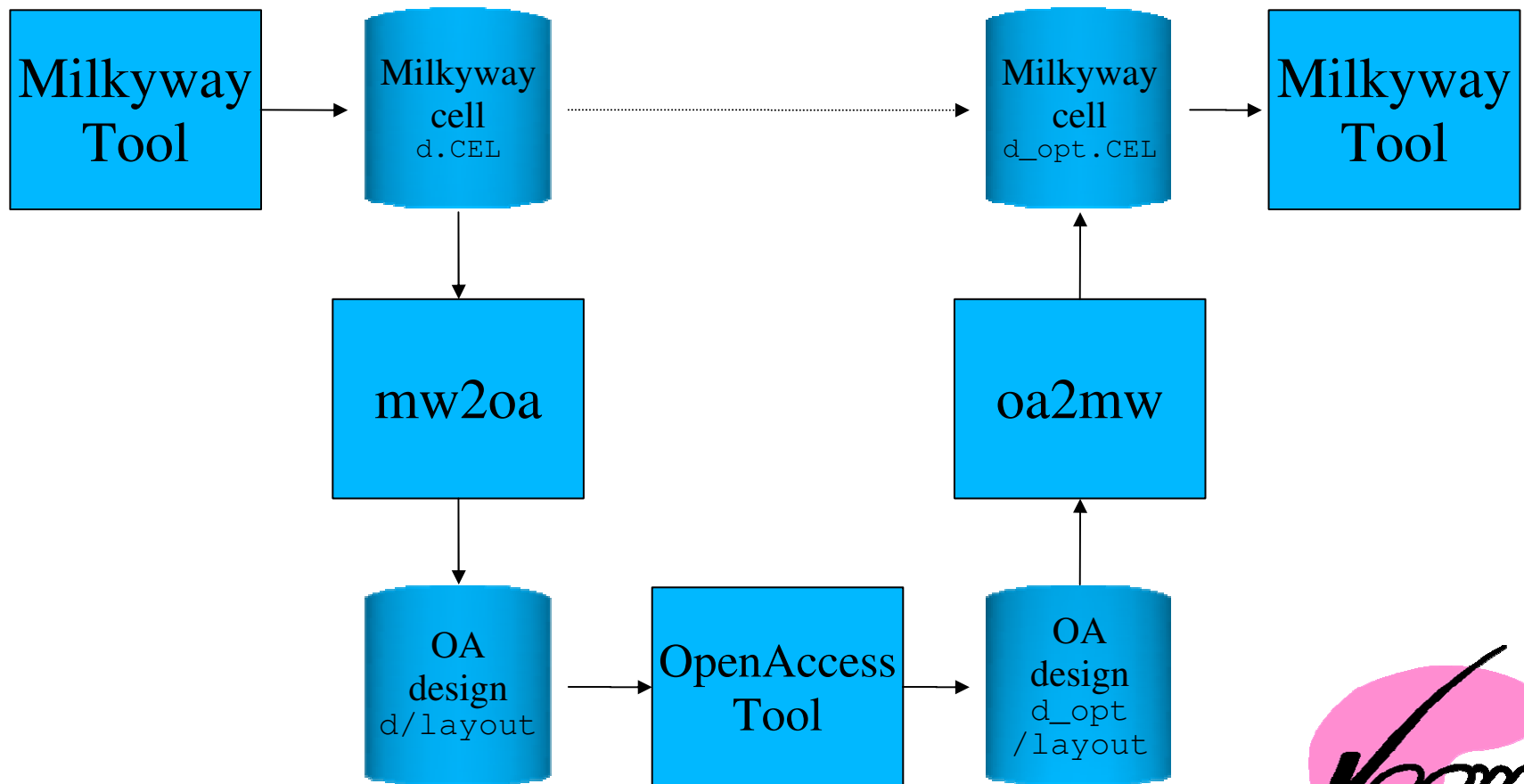
Reference Library Flow



- `mw2oa -lib /proj/lib/mw/stdCell \`
`-techLib tLib`
- `mw2oa -lib /proj/lib/mw/macros \`
`-techLib tLib`
- ...



Design Data Flow



Design Data Flow Commands

- Save Milkyway cell `d.CEL`
- `mw2oa -lib ../astro/blockHead \
-cell d \
-techLib /proj/lib/oa/tLib`
- Open design `d/layout` in OA, modify the routing and save the result in `d_opt/layout`.
- `oa2mw -lib ../astro/blockHead \
-cell d_opt \
-copyFrom d`
- The Milkyway view defaults to `.CEL`, OA to `layout`.



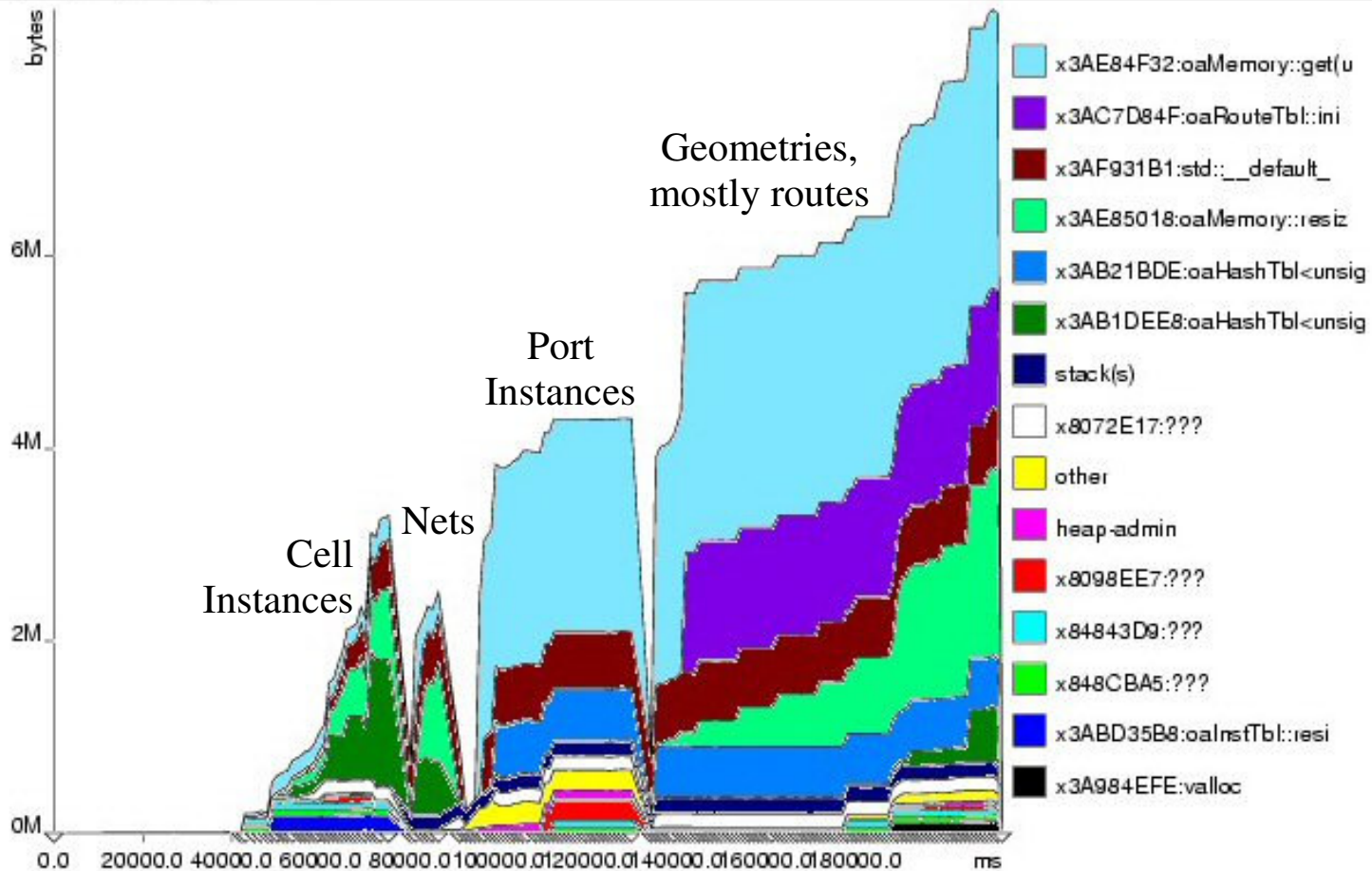
What Parts of the Translation Were Difficult?

- Place and route semantics in general
- Vias
- Milkyway variable route rules vs. OA routing constraint groups
- Rules for associating a technology library with an OA design library
- Name space for object names
- Design rule mapping



OA 2.0 Memory Usage Corrected in OA 2.2

726,875,742,572 bytes x ms



Performance Examples

- 1.9 million net design on 64 bit Solaris
 - Mower Milkyway-to-OA 0:45:32
- 350,000 net design on 3.4GHz RHEL 3.0
 - Mower Milkyway-to-OA 0:04:24
 - Mower OA-to-Milkyway 0:01:23



Mower of the Future

- OA 2.2 upgrade underway
- Integrate atech2oa, mw2oa and oa2mw into single application with TCL command language
- ECO functionality
- Whatever the customer needs



Map-In Wish List

- Make available to Map-In programmers:
 - `MWXDb_Create_Horizontal_Wire_WithRouteType()`
 - `MWXDb_Create_Vertical_Wire_WithRouteType()`
 - `MWXDb_Set_Contact_routeType()`
 - `MWXDb_Set_ContactArray_routeType()`
 - `MWXDb_Set_HorizontalWire_routeType()`
 - `MWXDb_Set_VerticalWire_routeType()`

 - `MWXDb_Get_Net_flag()`
 - `MWXDb_Set_Net_flag()`



Map-In Wish List

(continued)

- More variable route rule support:
 - C-API functions to read and write
 - License MDE for the Scheme functions, particularly *dbDumpAllVarRouteRules*
 - *TCL output from dbDumpAllVarRouteRules*
- Base array and floorplan creation commands
 - C-API functions to create
 - License MDE for the *Floorplan Dump* and *Route Dump* Scheme functions



Map-In Wish List

(continued)

- Map-In support for IC Compiler Milkyway extensions
- Access to the PARA view
- "Powered by Milkyway" logo



Wish Map-In Users Would...

- **Use the Milkyway forum!**

<http://synopsys.infopop.net>



Get Voom

- Voom Mower software
- Custom application development
- Voom Flow, custom flow development
- Physical design consulting

www.voom.net

