

# Backend Implementation Methodology Based on Lynx Design System

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**Abstract:** Lynx Design System is a big breakthrough among all the digital integrated circuit backend design tools. For the purpose of reducing the iterative repetition and lack of design flow, based on the traditional digital integrated circuit backend design tool, This paper demonstrate the circuit synthesis , design planning and clock synthesis ,routing by using Lynx Design System tool, validated the advantage of using Lynx Design System tool in the digital integrated circuit backend implementation.

## Background

Digital circuit backend design is A physical implementation phase in whole digital circuit module design process, it played a crucial role which will affected the function , dependability, yields of the digital mico-chips, so people care the accuracy and efficiency of digital circuit backend design process.

## Design Flow

The whole digital circuit backend design flow based on Lynx design system is compatible with the recommend reference methodology released by EDA software company such as Synopsys and Cadence ,

The design flow include circuit synthesis, design planning, clock synthesis, routing, parasitic extraction, static timing analysis and physical verification.

## Circuit Synthesis

Circuit Synthesis step in Lynx Design System means we constrain the design with timing and power specification , tool will call the synthesis tool do the map ,compile and optimize the RTL code into gate-level netlist. Lynx Design System can be configurable to support the top-down or bottom-up synthesis flow. The designer can edit the flow and change some option through graphical interfaces (as below Fig.1) accord the needs of the design project ,which is much more concision than the traditional method .

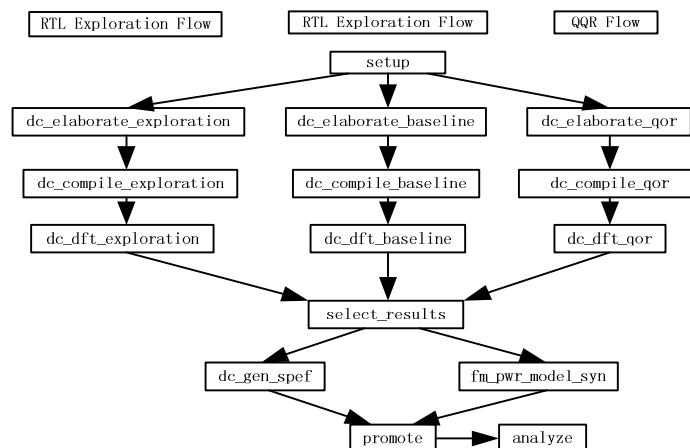


Fig. 1 Synthesis Task Flow

### Design Planning

Design Planning step (DP) in Lynx Design System consist of create floor plan and power strategy design.

DP totally support the multi-voltage power and top-down, bottom-up design planning also the IP-based complex design planning. The DP procedure chart (as below Fig.2) had showed the all possible DP sub-flow, which include design placement halos, insert DFM cells, power planning, IO assignment design tasks.

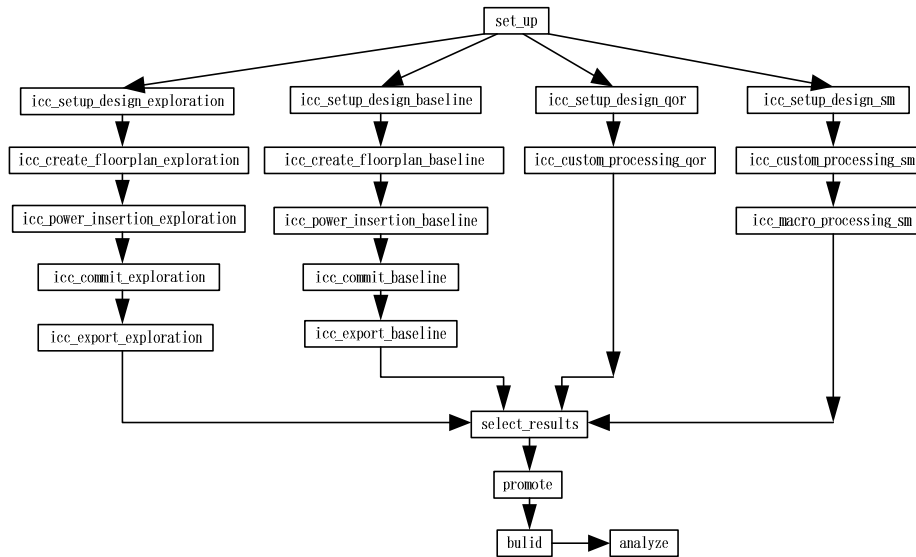


Fig. 2 Design Planning Task Flow

### Place and Route

Place and Route step in Lynx Design System will convert a well design planning digital circuit into the timing closed layout data. The Fig.3 demonstrate a place and route flow chart ,which has place standard cell, clock tree synthesis, routing, post-routing optimization etc.

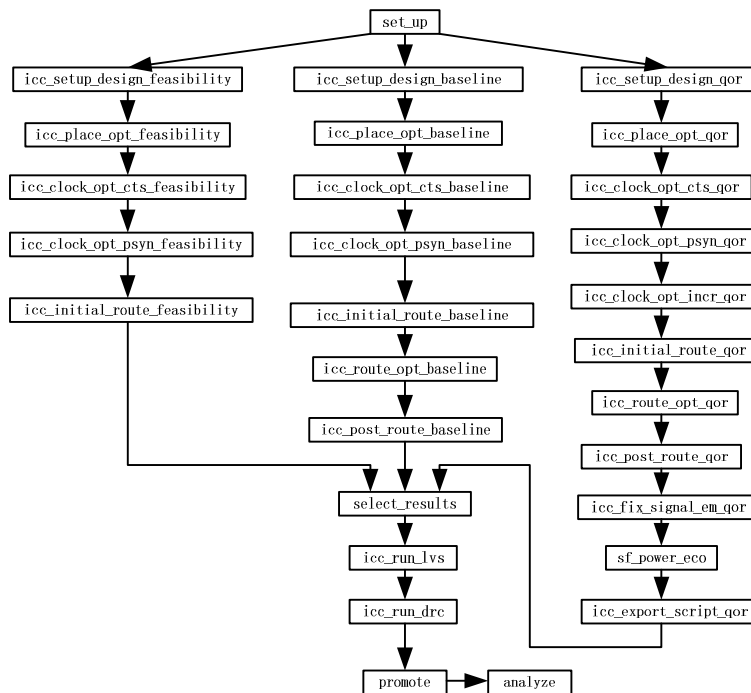


Fig. 3 Place and Route Task Flow

### Chip Finish

We do the Chip Finish step in Lynx Design System , it mainly consists the post-route layout data processing to satisfy the physical design rule also maybe some DFM optimization on the final layout. Fig.4 show the Chip Finish tasks such as : Filler cells insertion, DRC auto fixing, metal fill etc.

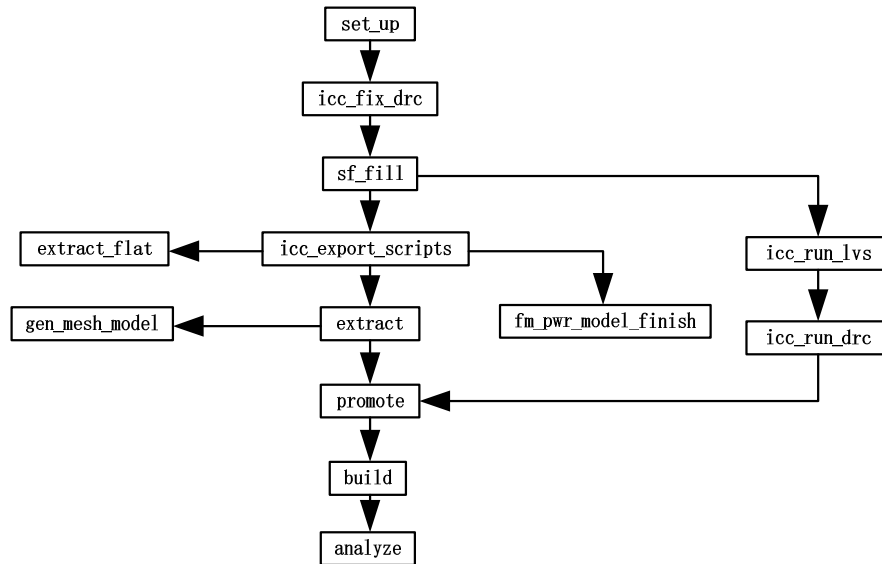


Fig. 4 Chip Finish Task Flow

### Real Time Manage

Real time manage module provide a visual interface to initialize, set configuration and manage the whole design flow which transform the RTL into GDS. It use Flow Editor , Execution Monitor , QoR Viewer to implement the management. In Flow Editor (as below Fig.5), we can change the sequence, redefine the sub-submission and reconnect the task.

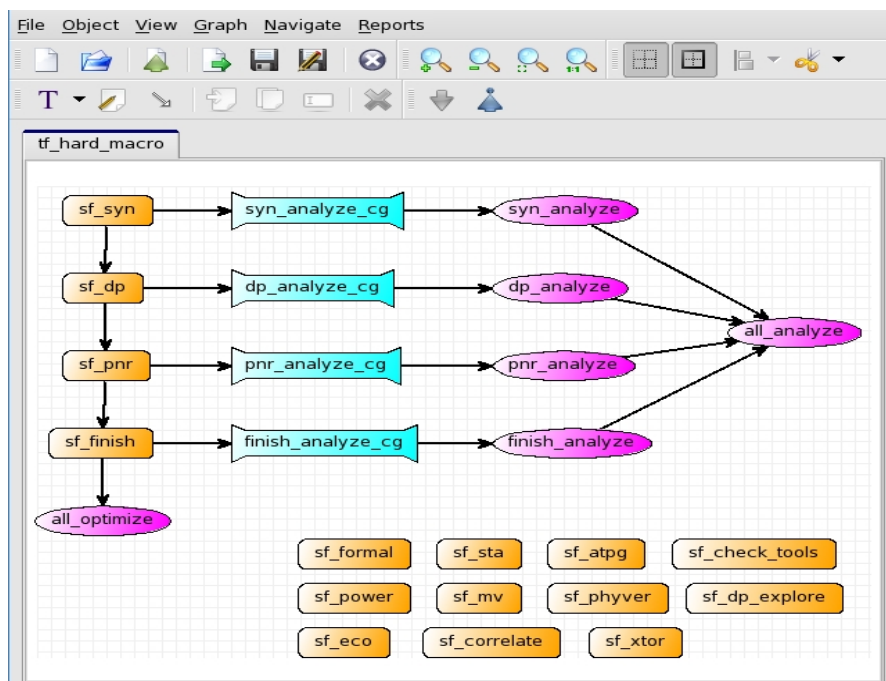


Fig. 5 Flow Editor

And Monitor (as below Fig.6) also provide a man-machine friendly interface, it's like a windows for designer to start single task step by step or multi-task parallel executing .We can judge the running state by the color of task item (green is succeed and red is failed ) in Execution Monitor.

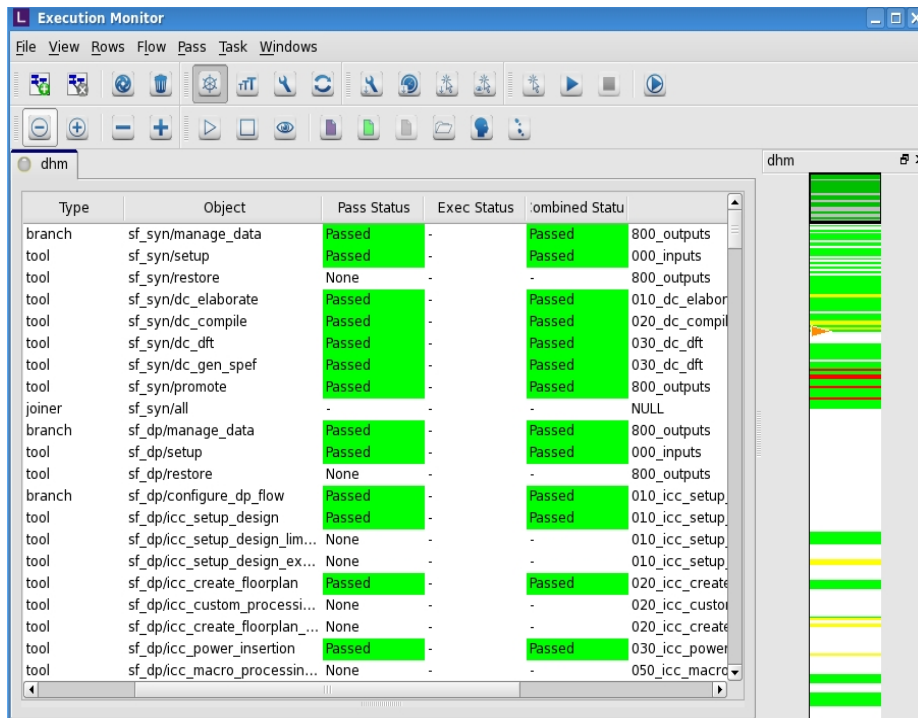


Fig. 6 Execution Monitor

## Summary

This paper introduce a backend implement methodology based on Lynx Design System, it explained some sub-module of Lynx Design System and also showed how to use the graphic interface to manage the design flow. Backend implement methodology based on Lynx Design System, has a big advantage on the controlling the integrality of design flow and make a great convenience for designer who are not familiar with the complex digital circuit backend design flow, and design team members can share succeed tap-out design flows on different foundry's process .

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## References

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