



Synthesis Guidelines

Macro Synthesis Strategy

- Strategy
 - Top down for designs < 100K gates
 - simpler
 - Bottom up for designs > 100K gates
 - Faster run time
- Timing constraints
 - Key to successful synthesis and physical design
 - Start as the part of specification and reviewed regularly
 - Including
 - Clock definition
 - Setup time for macro synchronous input
 - Clock to output delay for macro synchronous output
 - Input/output delay for all combinational path
 - Input driving and output loading
 - Operating conditions

Subblock Synthesis Strategy

- Similar guidelines as macro synthesis strategy
- Start **preliminary synthesis ASAP**
 - Identify and fix timing problems early
 - Modify or restructure the RTL according
 - Target : within 10 ~ 20% of the final timing budget

Synthesis Process

- Subblock level
 - Complete each subblock using specified timing
 - Perform characterization for each block
 - Refine the constraints and resynthesize
 - Iterate if required
- Macro level
 - Top down
 - Perform characterization on macro using top level constraints
 - Incremental compile
 - Bottom up
 - Compile each subblocks using timing budget
 - Perform characterization on macro using top level constraints
 - Incremental compile
- Preserve clock and reset networks
 - Set infinite driving strength

Synthesis Related Checking

- Before synthesis
 - Run linter
 - Unintentional latch, non-synthesizable RTL, incomplete sensitivity list, ...
 - **Syntax checking** of synthesis script
 - Elaboration checking
 - Types of inferred sequential elements, resource allocations
- After synthesis
 - Combinational loop checking
 - Latch checking
 - Design rule violation checking
 - Testability checking
 - Equivalence checking
 - Check equivalence between RTL and synthesized netlist

Coding Guidelines for Synthesis Scripts

- Header
- Comments
- Under revision control system
- No hard-coded numbers and path
 - Variables used in the body and values set at the top
- As **simple** as possible
- Common comments reside in a single setup file
 - Library path, search path...
- Thorough test of scripts for parameterized soft macros