# Livesynthesis: Towards An Interactive Synthesis Flow

Tech ID: 32828 / UC Case 2016-858-0

## BACKGROUND

In digital circuit design, synthesis is a tedious and time consuming task. Designers wait several hours for relatively small design changes to yield synthesis results.

## TECHNOLOGY DESCRIPTION

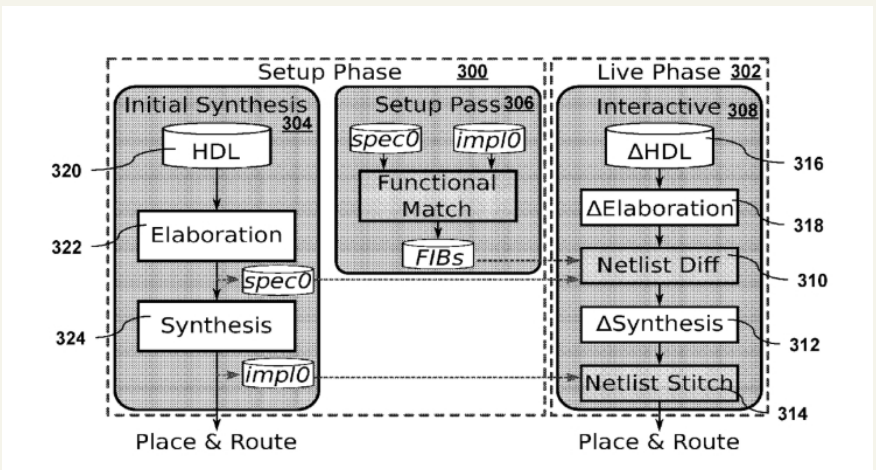
The LiveSynth flow extracts a small subset of the design for synthesis and merges it back into the original synthesized netlist, thereby achieving results comparable to the non-incremental synthesis.

LiveSynth includes two phases: a setup phase and a live (interactive) phase. The setup phase performs a regular synthesis of the whole design, finding invariant regions that are used as incremental grains for the live phase.

More particularly, during the setup phase, LiveSynth automatically defines regions of a few thousand gates that make up the incremental grains. IN these incremental grains, LiveSynth finds invariant cones that are regions that do not change functionality across synthesis. These cones define regions where further optimization is not possible or necessary.

During the live phase, each time there is a change in the resistor-transistor logic, LiveSynth performs and interactive pass that determines which changes were affected by the change and synthesizes only those regions.

Fully optimized designs are achieved using a background process that optimizes the design of the first set of changes while the user works on the next set of changes. The background process removes imperfections inserted by the live flow, thereby improving the design implementation.




## CONTACT

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## INVENTORS

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## OTHER INFORMATION

### KEYWORDS

Digital Circuit Design, Invariant Cones, Synthesis Flow, Incremental Synthesis, Electronic Design Automation, Design Productivity

### CATEGORIZED AS

- **Computer**
  - Hardware
  - Software

### RELATED CASES

2016-858-0, 2018-689-0

## APPLICATIONS

Digital circuit design

## ADVANTAGES

- Incremental synthesis
- Rapid but accurate results
- Faster development cycle

## INTELLECTUAL PROPERTY INFORMATION

| Country | Type | Number | Dated | Case |
|---|---|---|---|---|
| United States Of America | Issued Patent | 11,599,700 | 03/07/2023 | 2018-689 |
| United States Of America | Issued Patent | 10,885,246 | 01/05/2021 | 2018-689 |
| United States Of America | Issued Patent | 10,614,188 | 04/07/2020 | 2016-858 |

Additional Patent Pending

## RELATED MATERIALS

- LiveSynth: Towards an Interactive Synthesis Flow - 06/18/2017

## RELATED TECHNOLOGIES

- DESIGN WORKFLOW IMPROVEMENTS USING STRUCTURAL MATCHING FOR FAST RE-SYNTHESIS OF ELECTRONIC CIRCUITS

## ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- DESIGN WORKFLOW IMPROVEMENTS USING STRUCTURAL MATCHING FOR FAST RE-SYNTHESIS OF ELECTRONIC CIRCUITS

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