How to analyze annotation report of the report_sdb_annotation command in Genus/Joules

Problem

In Genus/Joules, after reading the input stimulus (that is, `TCF`/`SAIF`/`PHY`/`SHM`/`VCD`/`FSDB`), I want to analyze the annotation summary report.

How can I analyze the output of the `report_sdb_annotation` command?

Solution

The report_sdb_annotation commands output two variations.

- Before the power is computed
- After the power is computed

In the annotation summary report the Object types are as following:

1. Primary Ports section provides the activity annotation information for design input ports, output ports, and I/O ports.
2. Sequential Outputs section provides the activity annotation information for Memory Output pins, Flop Output pins, and Latch Output pins.

- Arch ICGC represents the activity annotation for architectural or user-defined ICGs, that is, ICGC, which are available in RTL.
- Inferred ICGC represents the activity annotation for tool inserted ICGs.
- Total ICGC is the sum of activity annotation of Arch ICGC and Inferred ICGC.

3. Drivers section provides the activity coverage information for driver nets.

A net is driver net when it is the following:

- Net of sequential output pin
- Net of combinational output pin
- Net of Input ports

That is,

```
Total Driver nets =  expr [llength [vfind / -pin instances_seq/*/pins_out/*]] + [llength [vfind / -pin instances_comb/*/pins_out/*]] + [llength [vfind / -port ports_in/*]]
```

A net is an RTL driver net when:

- Net is user-defined.
- Module of the net is a user module and

Net is part of bus

- Net is part of bus
- Net name is not n_* (* is a number)
- Net is connected to the port or subport

That is, RTL driver nets include the following:

- `vfind / -pin instances_seq/*/pins_out/*`
- `vfind / -pin instances_comb/*/pins_out/*`

4. DFT section provides the annotation information for activity coverage for DFT-related pins.

In the Annotation Report which is reported computing the power We have following components.

Stim Id : /stim#1

Stim file : waves.shm/

Stim file format : shm

Top instance : /uart_tx_test/test_uart

Design Top : /uart

Num frames : 1

Duration : 4.83394e+06ns

---------- Annotation Report ----------

Object Type	Asserted	UnAsserted	Unconnected	Total	Asserted%
	+ Constant				
Primary Ports					
Inputs	11	0	0	11	100.00%
Outputs	10	0	0	10	100.00%
I/O	0	0	0	0	N/A
Sequential Outputs					
Memory	0	0	0	0	N/A

Flop	55	0	0	55	100.00%
Latch	0	0	0	0	N/A
Arch ICGC	0	0	0	0	N/A
Inferred ICGC	0	0	0	0	N/A
Total ICGC	0	0	0	0	N/A
Drivers					
Driver nets	69	255	0	324	21.29%
RTL Driver nets	58	0	0	58	100.00%
DFT					
Input Ports	0	0	0	0	N/A
Flop Outputs	0	0	0	0	N/A
Memory Outputs	0	0	0	0	N/A

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1. Asserted: When the Activity from the stimulus is mapped to its respective signals of the design.
2. Unasserted : When the Activity from the stimBEFOREulus is NOT mapped to its respective component of the design. This could have 2 Possibilities:
    - Signal present in the design and not in the Stimulus.
    - Signal present in the stimulus and not in the Design
3. Constant : If a Signal has a constant Value in the stimulus file.
4. Unconnected : If a signal is left undriven or unloaded in the design.
5. Total: Gives the sum of the signals reported (Asserted + Unasserted + Constant + Unconnected)
6. Asserted% : Is the Rate of Assertion with respect to the Total number of signals. [(Asserted x 100)/Total].

In the Annotation Report which is reported AFTER computing the power We have following additional components.

Stim Id : /stim#1

Stim file : waves.shm/

Stim file format : shm

Top instance : /uart_tx_test/test_uart

Design Top : /uart

Num frames : 1

Duration : 4.83394e+06ns

---------- Annotation Report ----------

Object Type	Asserted	User_Asserted	Default	Computed + Constant	Clock_Source	Unconnected	Total	Asserted%
Primary Ports								
Inputs	11	0	0	0	0	0	11	100.00%
Outputs	10	0	0	0	0	0	10	100.00%
I/O	0	0	0	0	0	0	0	N/A
Sequential Outputs								
Memory	0	0	0	0	0	0	0	N/A
Flop	55	0	0	0	0	0	55	100.00%
Latch	0	0	0	0	0	0	0	N/A
Arch ICGC	0	0	0	0	0	0	0	N/A
Inferred ICGC	0	0	0	0	0	0	0	N/A
Total ICGC	0	0	0	0	0	0	0	N/A
Drivers								
Driver nets	69	0	0	157	0	0	226	30.53%
RTL Driver nets	58	0	0	15	0	0	73	79.45%

RTL Driver nets 38 0 0 43 0 0 43 75.45%

DFT

Input Ports	0	0	0	0	0	0	0	N/A
Flop Outputs	0	0	0	0	0	0	0	N/A
Memory Outputs	0	0	0	0	0	0	0	N/A

---

1. User_Asserted: When a pin activity is set manually by the user using set_pin_activity.

2. Default: When the neither the signal is not present not the tool could calculate the pin activity of a particular object of the design then the tool takes the default pin activity

3. Computed: The tool computes the pin activity by relying on the pin activity of its corresponding pins using activity propagation.

4. Clock_Source: Number of clock source pins for the specified object type. Clock source pins are the ones whose activities are inferred from SDC.

5 . Total: Gives the sum of the signals reported (Asserted + User_Asserted + Default + Computed + Clock_Source + Unconnected + Constant)

Better the annotation, better is the accuracy of the estimated power.

You can report the list of instances with activity either unasserted or computed by using the following command:

```
report_sdb_annotation -stims /stim#1 -show_details seq:unasserted
report_sdb_annotation -stims /stim#1 -show_details seq:computed
report_sdb_annotation -stims /stim#1 -show_details icgc:all
```

Example:-

```
@Joules> report_sdb_annotation -stim  /stim#1 -show_details comb:computed:all
```

Stim :/stim#1

Design :uart

Total 'comb:all' nets : 560

Total 'comb:computed:all' nets : 386

/uart/uart_baud/n_22 : /uart/uart_baud/g221__6260/Y

/uart/uart_baud/n_22 : /uart/uart_baud/g219__2398/C

/uart/uart_baud/n_21 : /uart/uart_baud/g222__4319/Y

/uart/uart_baud/n_21 : /uart/uart_baud/g219__2398/D

/uart/uart_baud/n_20 : /uart/uart_baud/g223__8428/Y

/uart/uart_baud/n_20 : /uart/uart_baud/g220__5107/D

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Net Associated to the pin The Pin that is reported under computed combinational.

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2325

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5

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