Molding Functional Coverage for Highly Configurable IP

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Is IP Configuration A covered in all operating modes?

Functional coverage for RTL source may not be applicable in all configurations
Employ (lots of) waivers?
Configuration may have multiple top-level modes of operation
Need to cross with mode in every covergroup.

Use a Flexible Hierarchical Functional Coverage Model!

Directed Acyclic Graph: children inherit from parents
Automation processes model to generate SystemVerilog

Configuration Variables
Define applicable coverage
Filters-out invalid cross scenarios in covergroups

Cover Variables
Defines point-of-observation coverage
Used in (any number of) covergroups as contextual cross scenarios

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RTL Super-set
IP Customer Config A
No low power options

IP Customer Config B
off, L0s, L1, L1PM substates

Cover Groups

LowPower

Coverpoint Data {
  bins Data_0[] = { 8’hFB, 8’hFC, 8’hFD }; 
  // contd...
}

coverpoint Control {
  bins Control_0 = { 1 }; 
  // contd...
}

C:
cross Data, Control, ltssm_state {
  bins pkt_delim_cross_0 = 
    binsof(Data.Data0) &&
    binsof(Control.Control_0) &&
    binsof(ltssm_state.ltssm_state_0);
}