Low Power Extension In UVM Power Management

Priyanka Ghарат, Shikhadevi Katheriya, Avnita Pal

Problem Statement/Introduction

Incorporating Power Architecture either is in conjunction with or in sequence to functional verification using different languages, many times with different team members using different tools, and divergent approaches leading to potential errors, almost a fourth dimension to our strategy leveraging the test bench architecture.

- Industry seems to be following a parallel path with respect to:
  - Methodologies based test bench
  - Power Architecture, including Unified Power Formats (UPF)
  - Both are fundamental requirements to IP and ASIC verification especially in the power saving mobile world.
- It would be more efficient to do Methodologies based Functional Verification and Coverage interleaved with Low Power Implementation.

We have noted previous works in power libraries for VMM and have corrected shortfalls and failings and have modified suitably to work within UVM, which is a much enhanced Methodology.

Implementation Details/Diagram

An overall UPF structure is created using UVM classes which include different task as creating power domain, different scopes then supply nodes for each of the domain which are created. These classes are used as library and can be extended for creating structure based on DUT/SOC architecture.

Low Power Extension In UVM

Power Management

REFERENCES

1. UVM Community (accellera.org) https://accellera.org/community/uvm
2. Guide to changes in IEEE 1801-2013 (UPF 2.3) (techdesignforums.com)

CONCLUSION

- Incorporating Power Management architecture within UVM methodologies alleviates challenges of functional verification engineer and power management divide
- Proposed in-built Power Domain Classes as extension to UVM Package as Library may be extended to Devices, multi-Cores, Memories, Bus Interface, etc giving one package for implementation ease
- Consolidation of Functional Verification and Power Management will lead to reduced verification time and better chance to meet the time to market deadlines.