

Problem Statement/Introduction

- To verify toggling of each SystemC model interfaces in AURIX™ TC4xx Virtual Prototype(VP)
- To identify the interfaces/ports that are not exercised in test case regression
- Manually reviewing the toggle of each interface is cumbersome
- No tool available to capture the interfaces which are toggled during test case regression run on VP
- No reusable solution available across VP tools

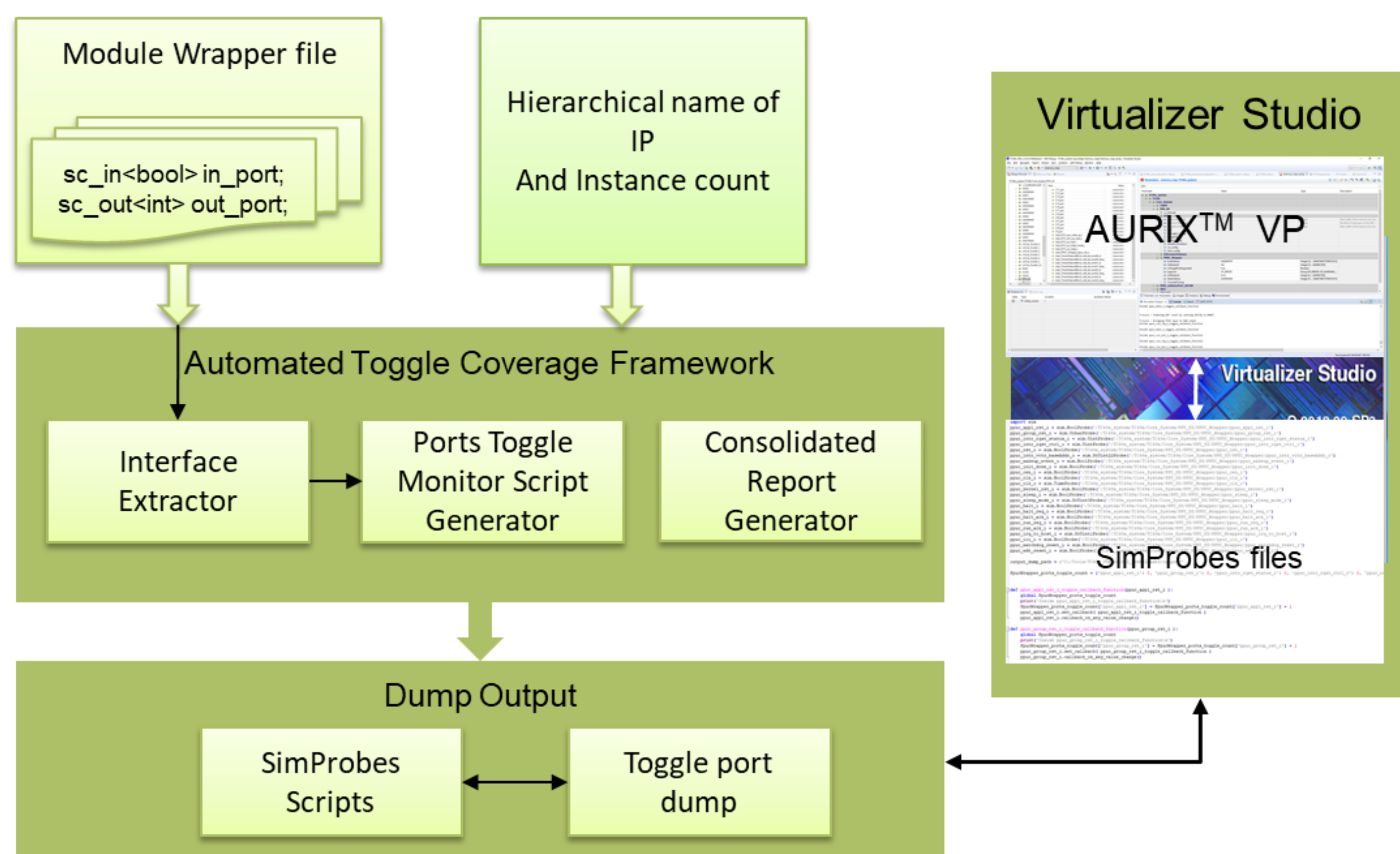
Proposed Methodology/Advantages

Infineon developed an in-house utility called **Automated Toggle Coverage Framework (ATCF)** - Developed in combination with python interface/utilities supported by VP tool on which AURIX™ TC4xx VP is developed

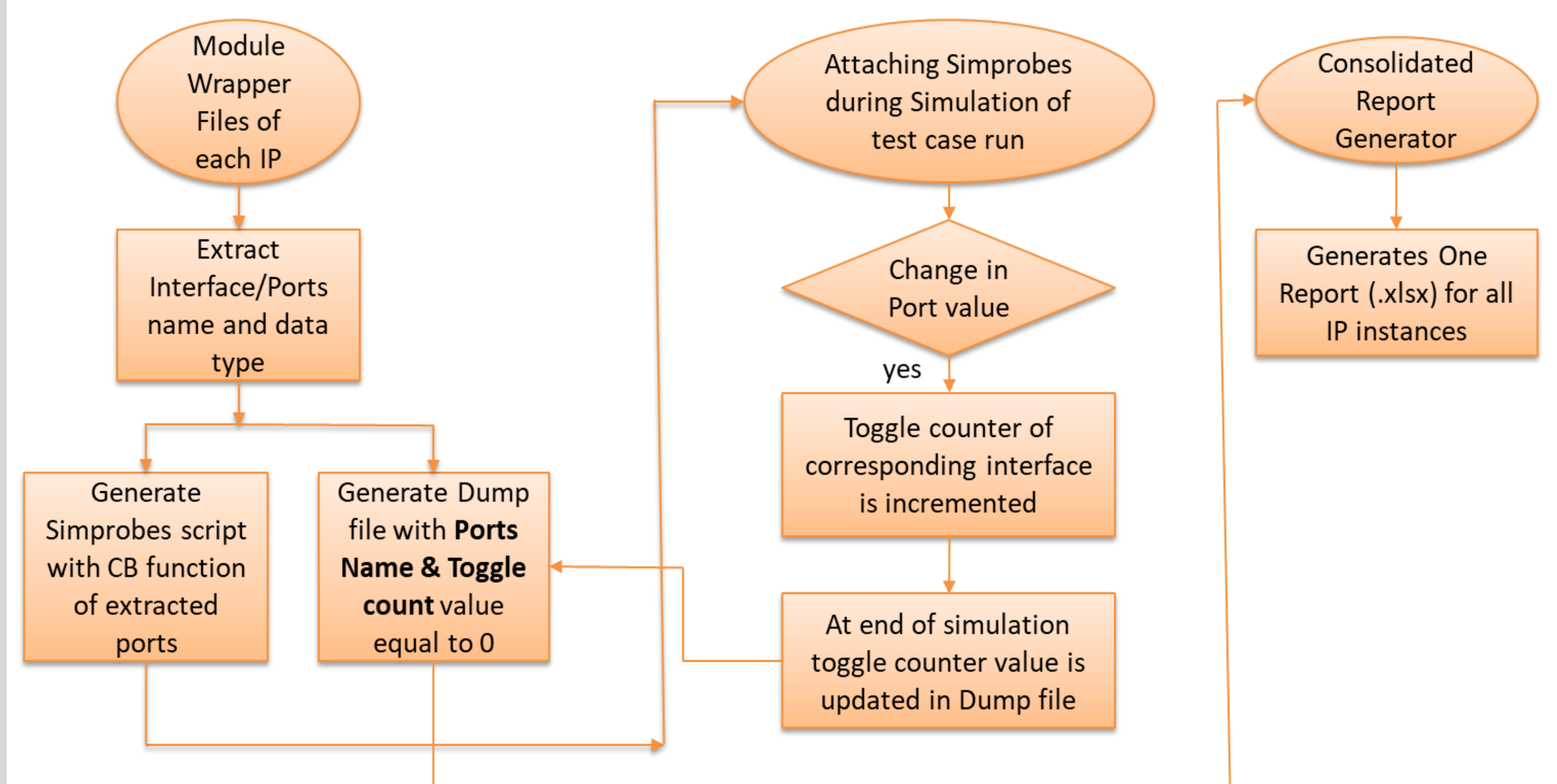
Automated Toggle Coverage Framework is a consists of :

- Interface Extractor:** Extracts the interfaces/ports list and its data type of each IP
- Ports Monitor Script Generator:** Generates Simprobes Python Scripts per module with call back function for each extracted ports, which are sensitive to any change in port value
- Consolidated Report Generator:** Generates consolidated report which consists of interface name and toggle count of interface during the simulation for each IP

Implementation Details/Diagram



Implementation Details/Flow Chart



Results Table

- ATCF is deployed for some of the IP's in AURIX™ TC4xx VP
- With series of test case improvement for untested ports the coverage gap is improved

Modules	Tested/Toggled Interface			Untested/Un toggled Interface		
	1 st Iteration	2 nd Iteration	3 rd Iteration	1 st Iteration	2 nd Iteration	3 rd Iteration
PPU	18(81%)	20(90%)	22(100%)	4(19%)	2(10%)	0(0%)
CSCU	12(85%)	13(92%)	14(100%)	2(15%)	1(8%)	0(0%)
LMU	5(83%)	6(100%)	6(100%)	1(17%)	0(0%)	0(0%)
Clocking	25(100%)	25(100%)	25(100%)	0(0%)	0(0%)	0(0%)

Conclusion

- Verification gaps in interface level is identified and improved by developing test cases for untested ports
- Any update/new in IP Interface will be extracted by framework and added to interface list for toggle coverage without much manual effort
- ATCF is expected to be deployed for all other IP's

REFERENCES

<https://www.infineon.com/cms/en/product/promopages/virtualizer-development-kit/>