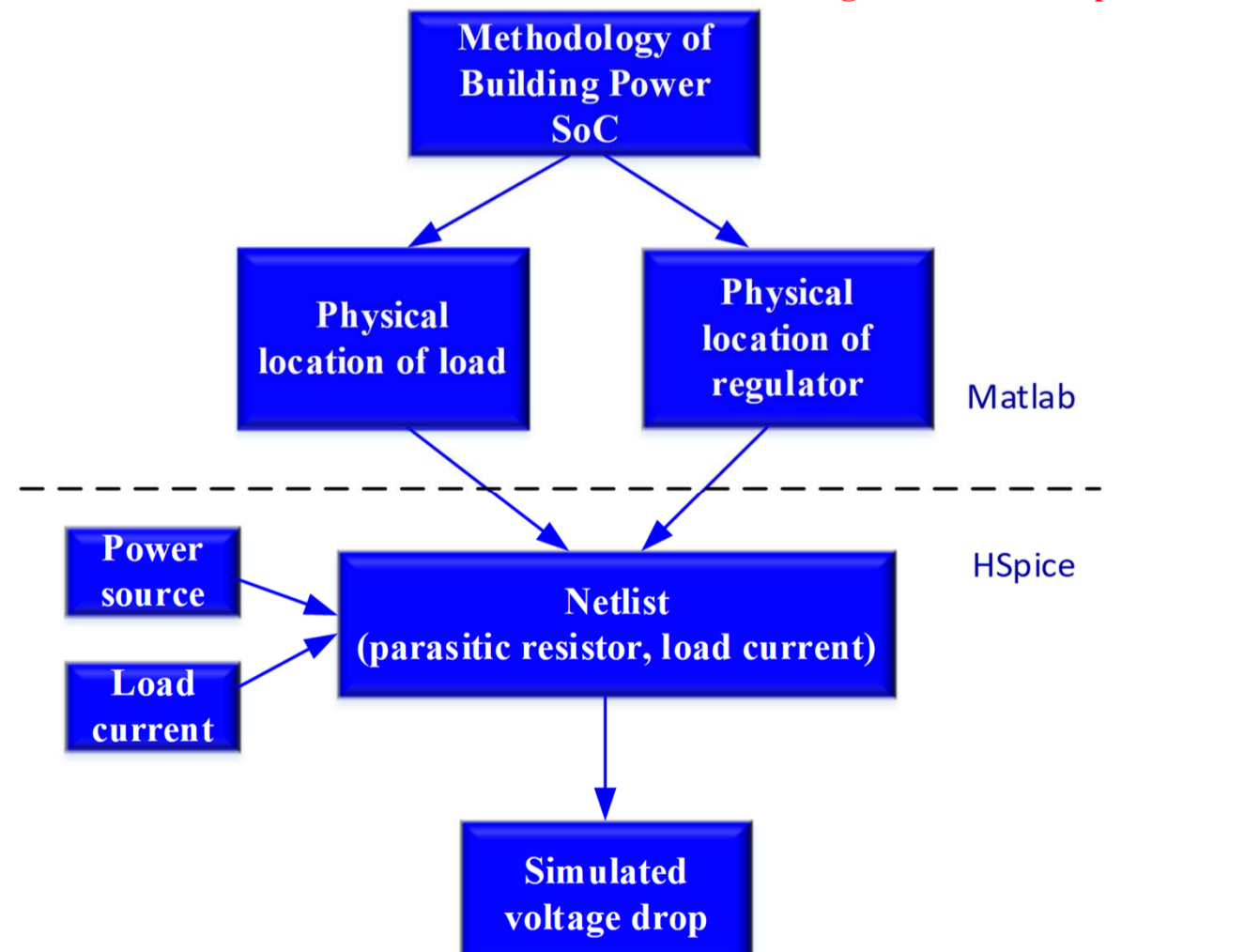
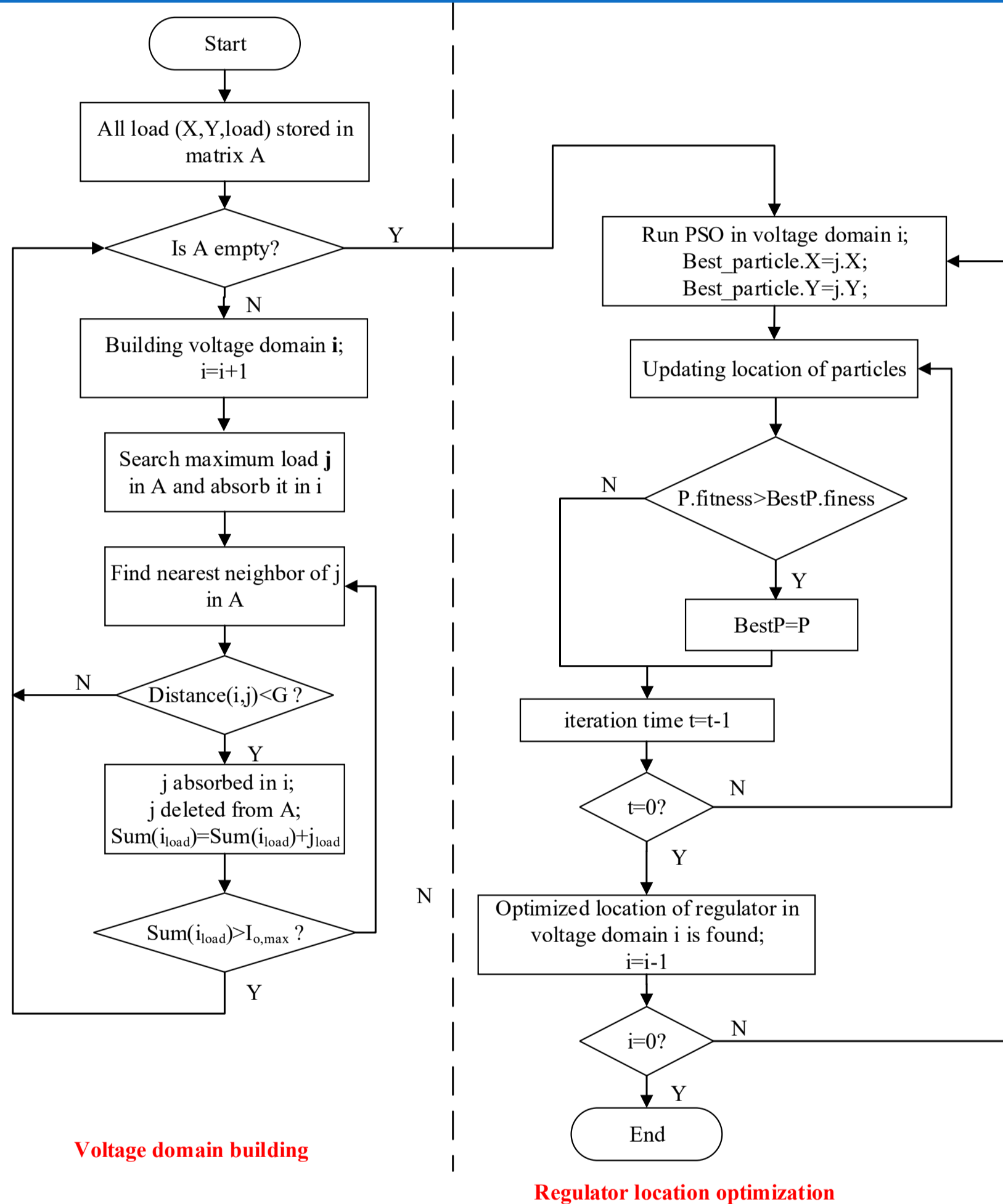


Abstract

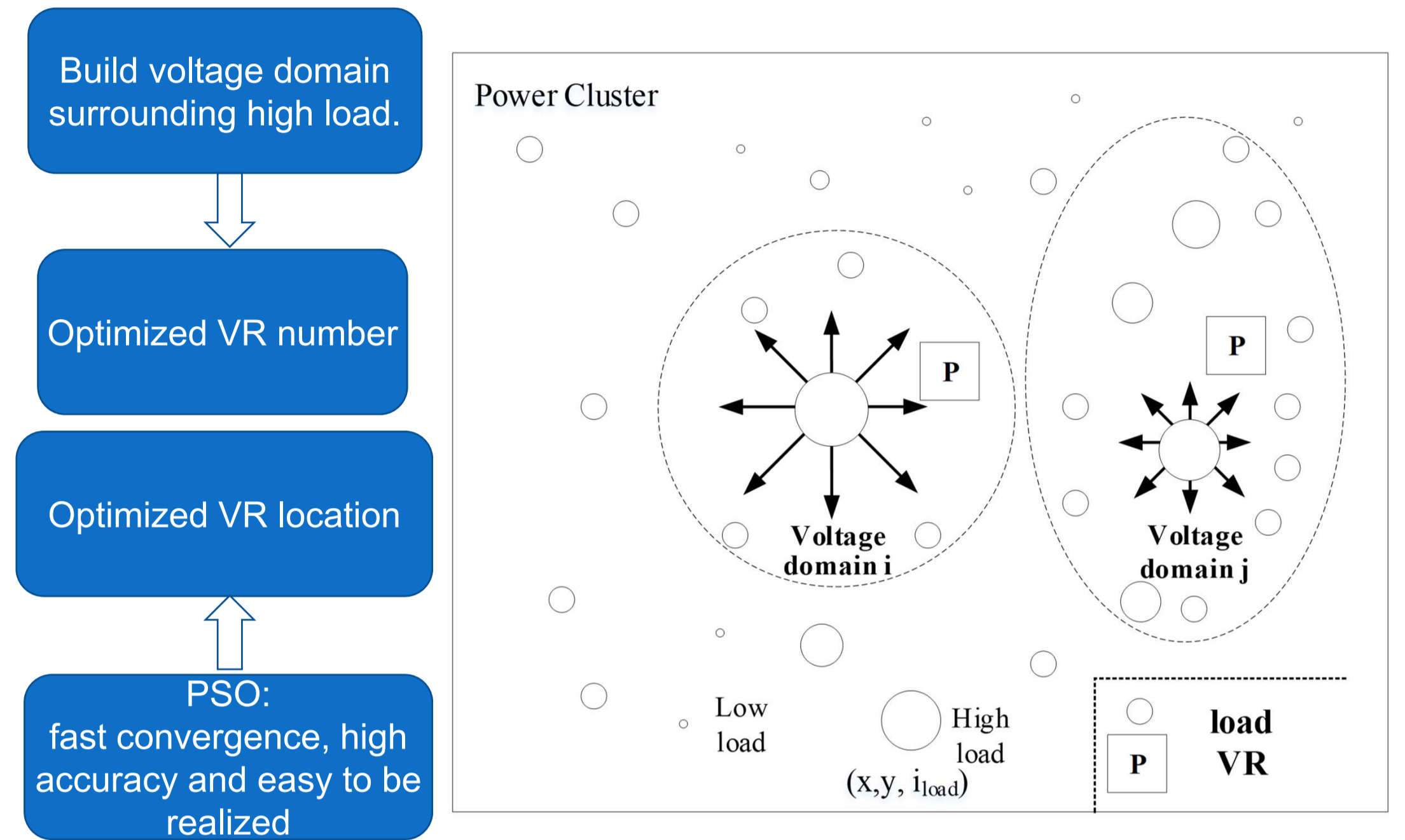
The power number and location are the critical issues in the design of power system on chip (SoC). In order to achieve optimized number and location of the regulators, an efficient algorithm is proposed. All loads are firstly divided into their own voltage domain, where only one regulator supplies power. The voltage domain is built, whose center is the load required highest current. The voltage domain continues developing, till the sum of the load current is higher than the maximum output current of regulator. The optimized location of regulator is calculated by the particle swarm optimization (PSO). The time and memory required are reduced. The proposed algorithm has been realized by MATLAB. The results were verified by IBM power grid analysis benchmarks. Compared with the benchmarks' own power distribution, voltage drop is decreased by the proposed algorithm.

Realization and Verification of Proposed Methodology

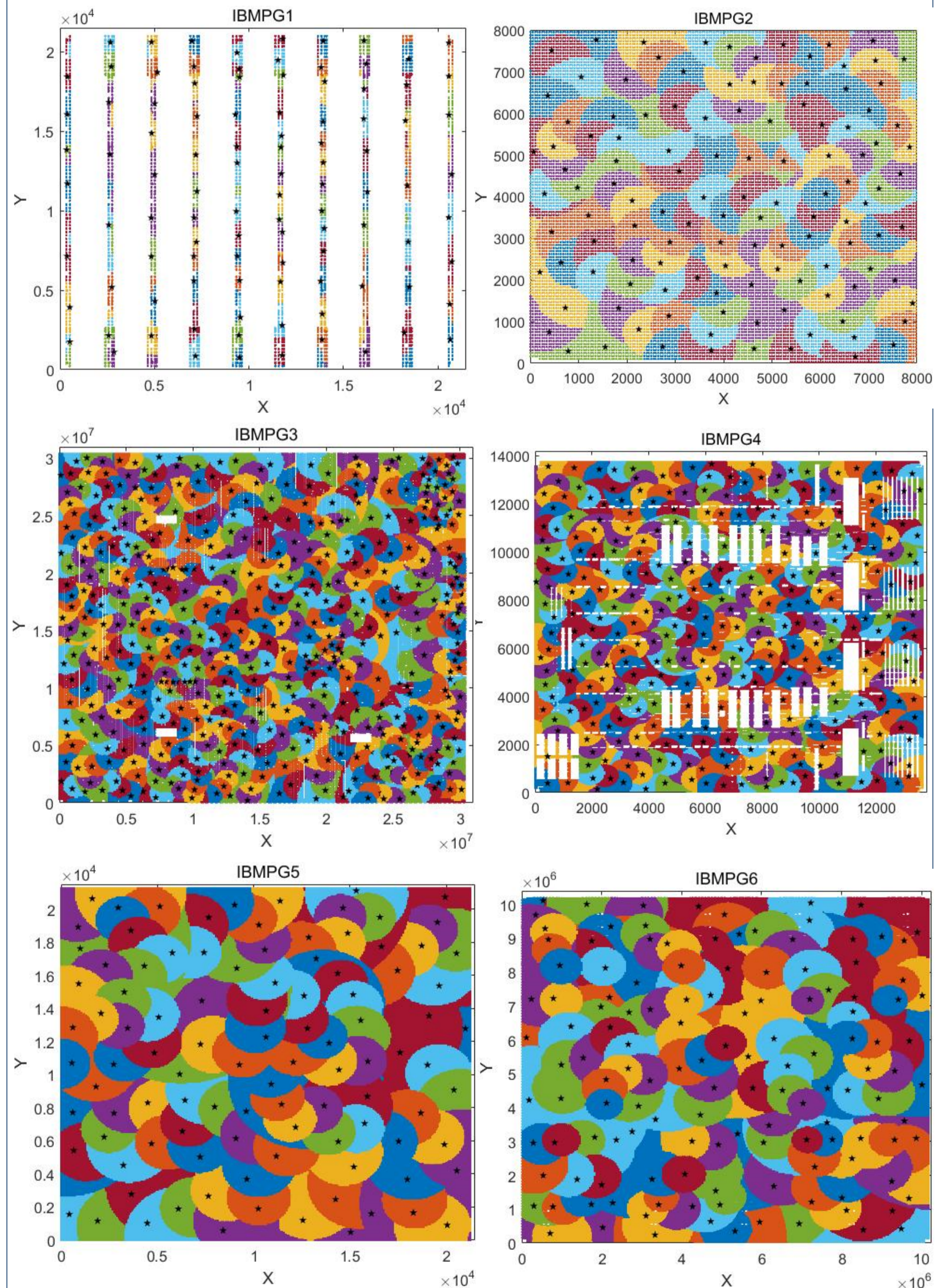


Motivation and Proposed Methodology

Most of the reported work are based on linear optimization. A large amount of computing time and storage is required for large chip.



Built Power Cluster for Different Benchmarks



Comparison of Power Voltage Drop in Proposed Work and IBM Benchmarks

Benchmarks	Voltage difference (V)	
	Minimum	Maximum
IBMPG1	0.164	0.79
IBMPG2	0.138	0.49
IBMPG3	0.0015	0.24
IBMPG4	0.002	0.08
IBMPG5	0.022	0.06
IBMPG6	0.0449	0.2

Reference

- [1] Nassif, Sani R. "grid analysis benchmarks." *Asp-Dac* 2008.
- [2] Kose, Selçuk, and E. G. Friedman. "Effective Resistance of a Two Layer Mesh." *IEEE Transactions on Circuits & Systems II Express Briefs* 58.11(2011):739-743.