PPEP: ONLINE PERFORMANCE, POWER, AND ENERGY PREDICTION FRAMEWORK
and DVFS Space Exploration

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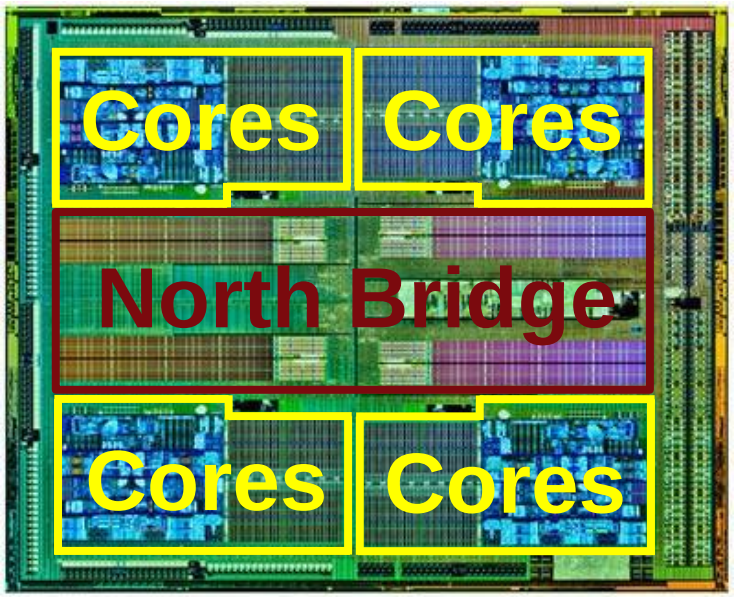
- Dynamic Voltage & Frequency Scaling Challenge
  - How to predict performance & power across VF states

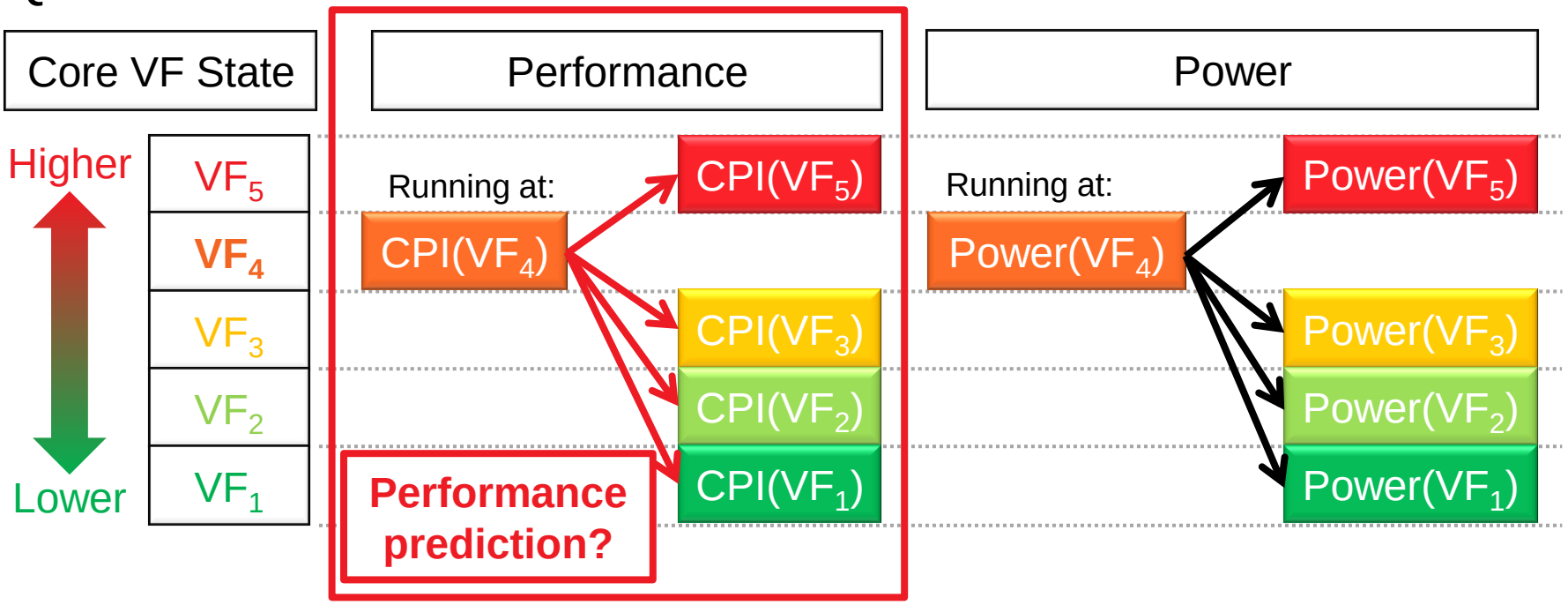
- Difficulties on modern processor
  - Multiple clock domains
  - Multiple power planes

Core Clock Domain & Power Plane	North Bridge Clock Domain & Power Plane
Scalable	Not scalable

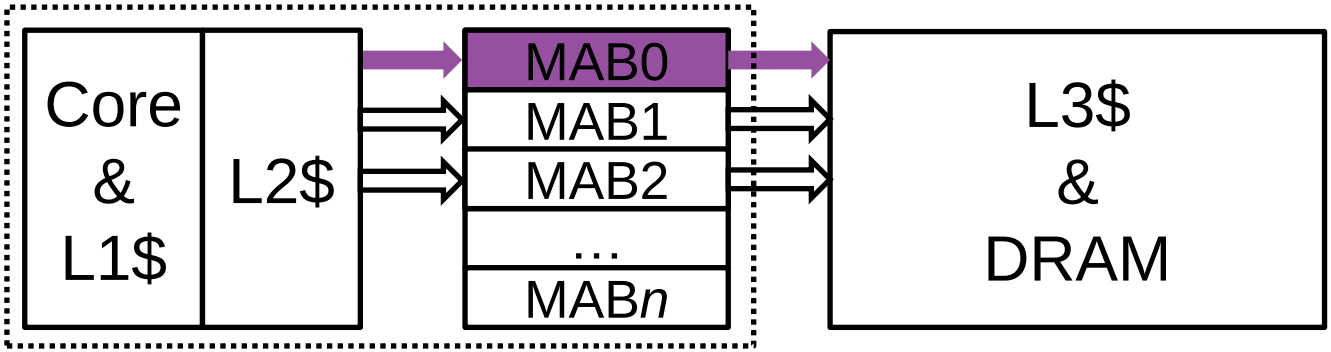


AMD FX-8320

Q1: PERFORMANCE PREDICTION



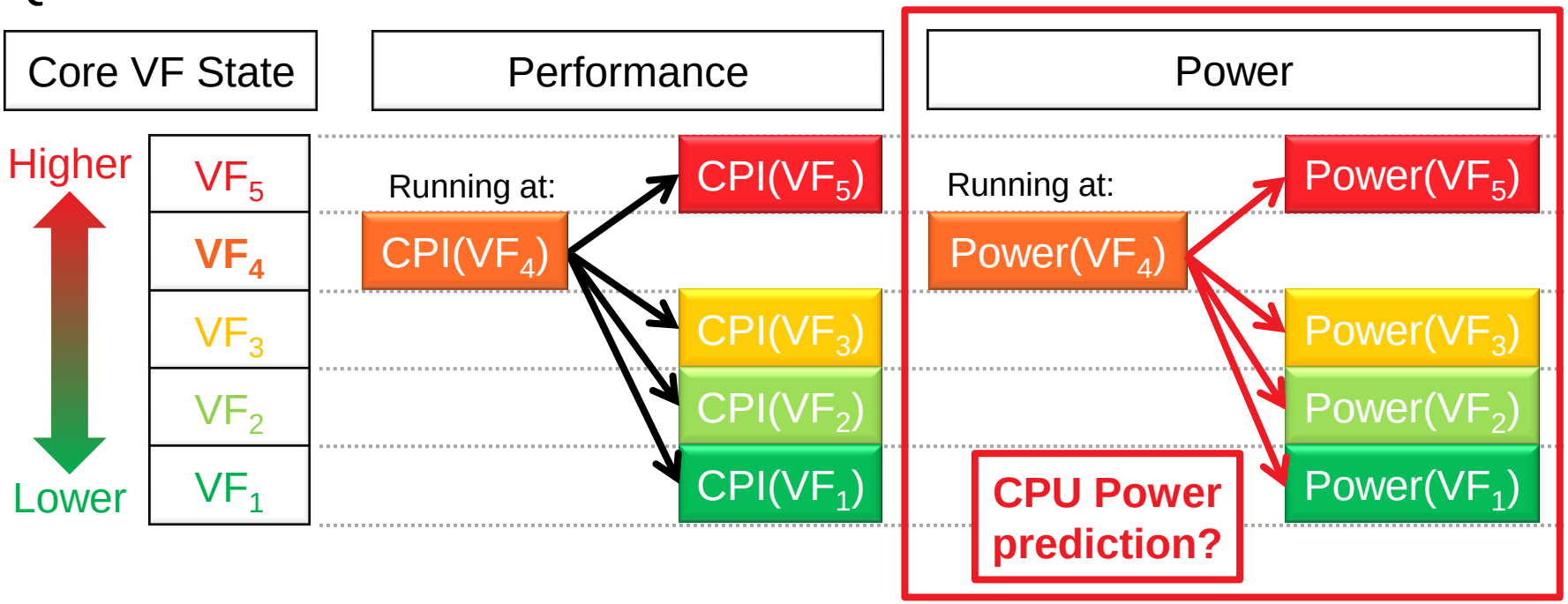
- LL-MAB: Miss Address Buffer (MAB) based Leading Loads (LL) CPI Predictor;



3.2% error

>2X freq. diff.

Q2: POWER PREDICTION



- Power model: CPU Events + Temperature
- Power prediction: LL-MAB + 2 observations of CPU events.
- 4.2% error across 5 VF states.

Wednesday 11:05AM

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