Power Considerations in Virtualized Environments

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Background

1. Power consumption of a server $P_{total} = P_{static} + P_{dynamic}$ (Watts)
2. Energy consumption $E = \Sigma_{i=1}^{t} P(i)$ (Watt-hour)
3. Dynamic Voltage and Frequency Scaling (DVFS) - combination of voltage and f set for processor

Goal: Energy Optimal VM Provisioning

- Goal:
  - Energy-optimally provisioning VMs on DVFS-enabled servers
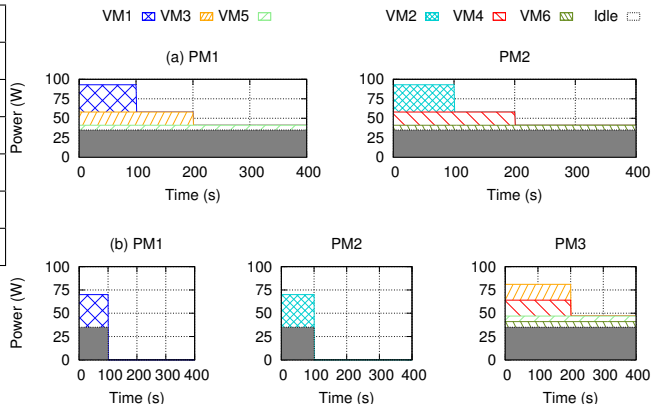 - Ensure completion time SLAs are met
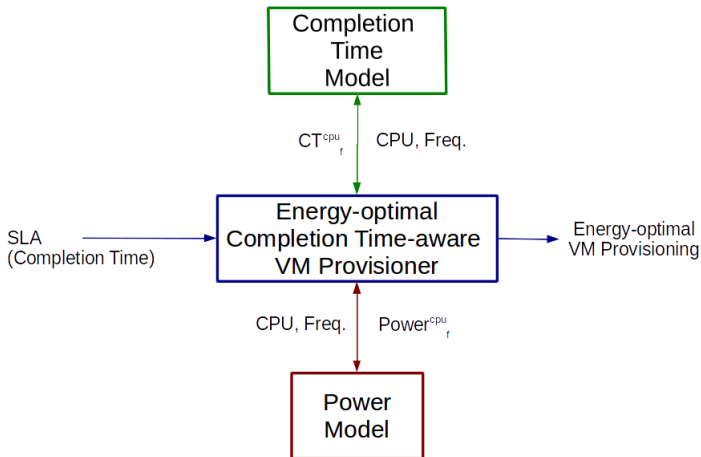
Where Existing Heuristics Fail

- 6 VMs need to be placed
- Best Fit Decreasing / First Fit Decreasing: ordering by CPU requirement size

VM#	CPU%	Time(s)
vm_1	60	100
vm_2	60	100
vm_3	30	200
vm_4	30	200
vm_5	10	400
vm_6	10	400

85% energy;
More saving if
DVFS applied

- **Hypothesis - tightest packing (least #servers) is not energy efficient for deadline-based provisioning.**