



HPM Panel

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Intel Power Management Overview

- Power Management & Turbo Opportunity
 - Automatic and policy driven processor power management to optimize power and performance within a given power, current, and thermal budget
- Global Energy Optimization (GEO)
 - A breakthrough application-aware runtime for energy optimization called GEO
 - GEO is a framework, and GEO's energy management strategies are extensible through a plug-in architecture
 - Through online learning, GEO plug-ins can discover application patterns then optimize hardware control knobs to make applications run faster
 - For GEO, Intel is re-architecting aspects of HPC processor design and moving to a SW-HW co-designed solution to unlock additional performance
 - GEO available to the community for free to accelerate innovation in energy management algorithms More here: geopm.github.io/geopm
- Intel HPC Software Stack
 - Provides a complete SW stack to drive HPC-specific power monitoring and control capabilities
 - Enables HPC-appropriate power management by integrating GEO with power-aware resource managers
- Datacenter Manager / Node Manager
 - Provides real-time power and thermal monitoring of server, PDUs, UPSs
 - Enables power capping at the rack and node level for datacenters with power constraints
 - Helps eliminate hot spots and optimize cooling and power management for overall TCO reduction and can reduce power and cooling costs

Case Studies for Intel Technologies

- Power Management & Turbo Opportunity
 - We often forget there are 3-legs to this stool; performance, power, **and thermal**
 - Worked with an HPC end-user to gain a 10% system performance/watt boost using better cooling
- Global Energy Optimization (GEO)
 - Up to 20% performance/watt gain on an HPC application running on Knights Landing
- Intel HPC Software Stack
 - MOU w/end-user using workload manager and schedulers to maximize output in a power capped system with a QoS optimization function
- Datacenter Manager / Node Manager
 - Using Intel technologies to monitor 1) server power, 2) inlet, chip, and outlet temperature, and 3) server airflow to monitor data center capacity and obtain up to 40% infrastructure

