POP - providing insight on application and system behavior

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Motivation

Why?
• Complexity and variability in machines and codes
  • Important to study microscopic behavior to understand macroscopic effects
  • Important to “isolate” programmer from details of machine. Let programmer focus on science

What can POP contribute?
• Detailed Insight and predictive capabilities
• Programming models and practices
• For “co-design” and use
• Hub
Targeted customers: all actors in EsDs

• **Code developers**
  • Assessment of detailed actual behavior
  • Suggestion of more productive directions to refactor code

• **Users**
  • Assessment of achieved performance on specific production conditions
  • Possible improvements modifying environment setup
  • Evidences to interact with code provider

• **Infrastructure operators**
  • Assessment of achieved performance in production conditions
  • Possible improvements modifying environment setup
  • Information for allocation processes
  • Training of support staff

• **Vendors**
  • Benchmarking
  • Customer support
  • System dimensioning/design
Detail and insight !!!

- Understand actual behavior in detail towards co-design and use
- What if
- Projection
- ...

- Unifying methodologies
  - Across tools and platforms
- Further tool development and analytics
Programming models and runtimes

• Developing programming model
  • Productivity
  • Portability: Homogenizing heterogeneity

• Providing advanced implementations
  • Compiler, scheduling policies, different target platforms (CPU, GPU, FPGA, big.LITTLE, ...), dynamic load balance, ...

• Promoting best practices and a throughput oriented methodology

• Channeling experiences to standardization bodies
  • Active members of MPI Forum and OpenMP ARB