Research Perspectives on Sustainability

HYPERION RESEARCH

HPC User Forum
September 2023
Mark Nossokoff

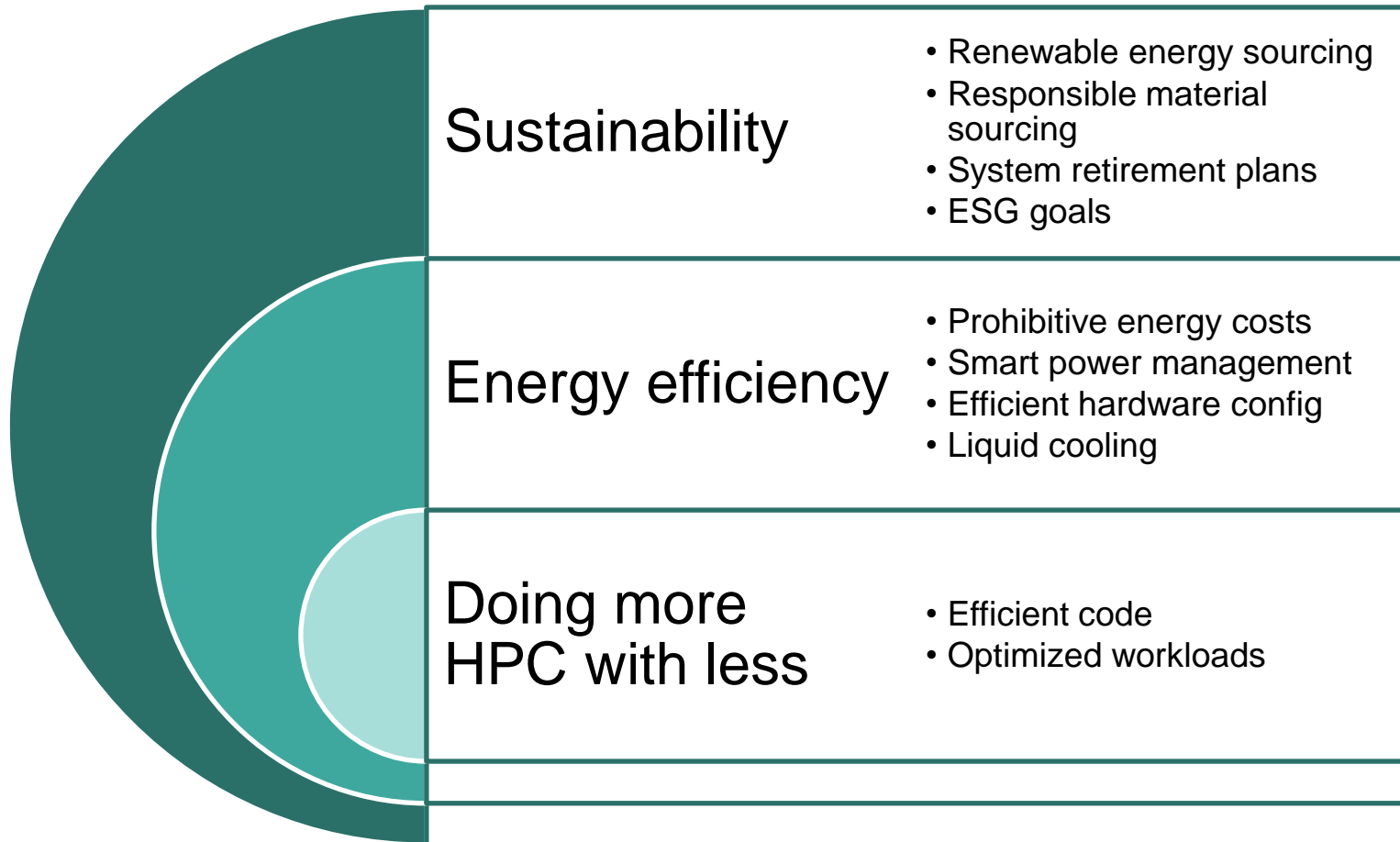www.HyperionResearch.com
www.hpcuserforum.com

Prioritizing Sustainability in Procurements

Sustainability and energy efficiency considerations will become a dominant factor in many procurements

- **New CPUs/GPUs/xPUs have substantially larger power requirements**
  - Maximize performance capabilities for these compute elements, consistent and affordable energy
- **Energy costs**
  - Energy crisis / inflation / geographic concern
- **Energy Consumption Legislation**
  - Recent legislation on the energy consumption of data centers
  - Implementation: energy-conscious procurements, renewable energy where possible, and optimizing workloads for efficiency
- **Environmental Stewardship**
  - The perception of environmental stewardship amongst HPC users
  - Metrics and requirements to identify sustainable vendors
  - Forward-thinking vendors want to respond to the call
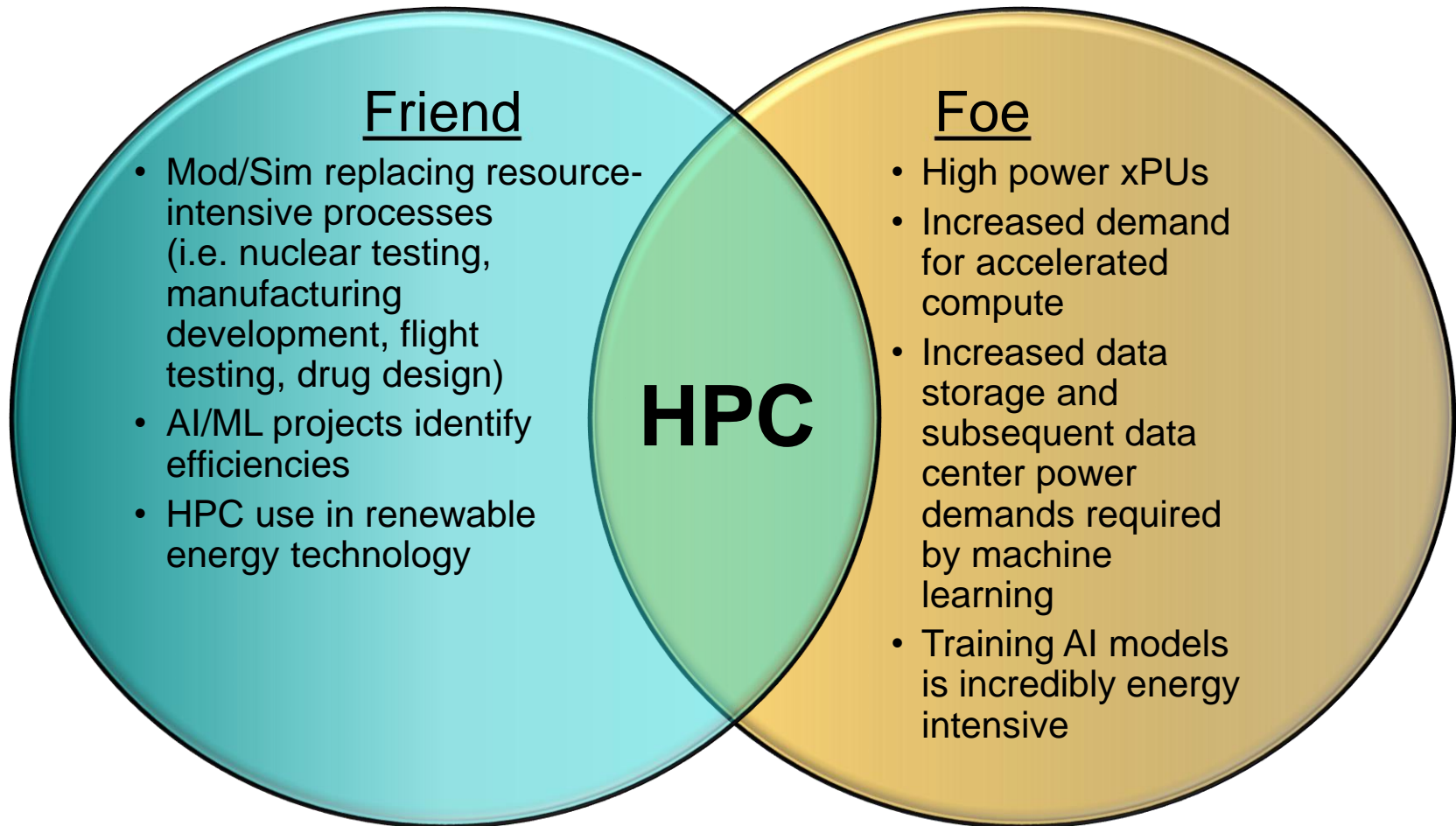- **New technologies are needed to improve energy usage**

HPC Site Goals and Strategies

Sustainability encompasses energy efficiency and doing more HPC with less

Sustainability	• Renewable energy sourcing • Responsible material sourcing • System retirement plans • ESG goals
Energy efficiency	• Prohibitive energy costs • Smart power management • Efficient hardware config • Liquid cooling
Doing more HPC with less	• Efficient code • Optimized workloads

Source: Hyperion Research, 2023

HPC – Sustainability Friend or Foe?

Friend

- Mod/Sim replacing resource-intensive processes (i.e. nuclear testing, manufacturing development, flight testing, drug design)
- AI/ML projects identify efficiencies
- HPC use in renewable energy technology

HPC

Foe

- High power xPUs
- Increased demand for accelerated compute
- Increased data storage and subsequent data center power demands required by machine learning
- Training AI models is incredibly energy intensive

Trends and Priorities in Sustainability

Broad range of motivations driving sustainability efforts

- **Motivations vary by region:**
  - APJ: ESG Goals
  - EMEA: Prohibitive Energy Costs
  - North America: Wanting to do more with less

Energy costs are impacting operations	Energy efficiency driving migration to cloud	Priorities in sustainability goals	Sustainability is influencing hiring practices
• ~2/3 say costs will defer the purchase of a new system • ~1/2 say costs will limit the capabilities of their system • ~1/3 say costs will reduce operational hours	• 76% cite energy costs as driver to move to the cloud • Users relying on CSPs to manage efficiency at scale • Government regulation is also driving movement to cloud, but to a lesser extent	• Data center architecture (54%) is prioritized more frequently than optimized cooling (42%) • Increasing focus on smart power management and telemetry (13% in the next 12-18 months)	• Focus on sustainability a requirement of new hires • Gap of knowledge for how to do sustainable HPC

Source: Hyperion Research, 2023; study sponsored by Dell, Intel, and NVIDIA

Sustainability Research

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Special Study

Perspectives on Sustainability in HPC: Current Views and Future Considerations

Jaclyn Ludema and Mark Nossokoff
March 2023

HYPERION RESEARCH OPINION

Sustainability is the societal goal of existing on this planet in a wa̶
without compromising the needs of future generations. Sustainab̶
be described as meeting the needs of present users without com̶
with a focus on the extraordinary power requirements of HPC sy̶
Hyperion Research has been tracking the growing influence the̶
procurement decision-making at various HPC sites around the w̶
have had to consider the current global energy crisis and geopol̶
market, and begin planning and implementing ways to make HP̶
sustainable.

HYPERION RESEARCH

White Paper

Sustainability and Energy Efficiency Found to be of Strategic Importance for HPC Datacenters

Sponsored by: Dell Technologies, Intel, and NVIDIA

Jaclyn Ludema and Mark Nossokoff
May 2023

HYPERION RESEARCH OPINION

There has been a recent shift in the HPC market priorities toward sustainability and energy efficiency in response to the current geopolitical climate and trends in HPC utilization. The cost of energy is on the rise worldwide following the COVID-19 pandemic, amidst financial recovery efforts, skyrocketing fuel source prices, and ongoing military conflicts.

The demand for HPC resources for AI/ML/HPDA workloads is increasing rapidly, and new CPUs/GPUs/xPUs with substantially larger power requirements than previous iterations gain popularity, while HPC sites and datacenters are experiencing the financial strain of high energy costs. In conjunction with additional factors, such as new government regulations on energy-efficient datacenters, and sustainable business practice priorities, many HPC center decision-makers have had to prioritize sustainability and energy efficiency in operations and procurement plans.

Questions?

We welcome questions, comments, and suggestions

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