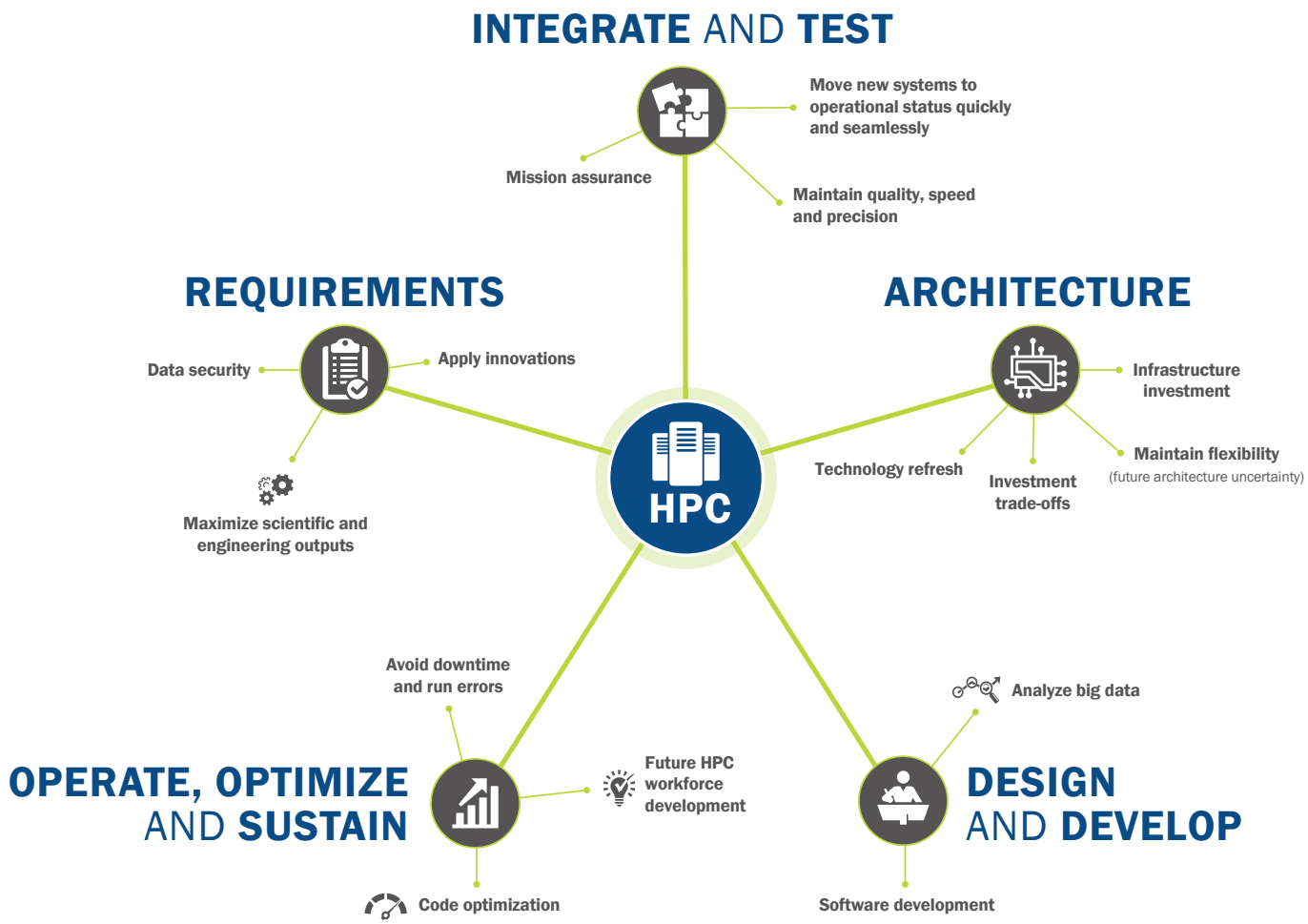
HIGH PERFORMANCE COMPUTING (HPC)

MASTERING COMPLEXITY

SAIC®
Redefining Ingenuity

HPC OVERVIEW

SAIC collaborates with scientists, technologists, engineers and decision-makers across the federal government, industry and academia to apply complex science to real-world challenges. We transform ideas from the drawing board into mission success. Our computational scientists offer strategic insights and trusted advice to customers at every stage of the technology lifecycle. Our approach to mission-driven HPC delivers tailored solutions that allow our customers to address national priorities.



*All resources are available at **saic.com/hpc***

HPC Engineering

Engineering was once tinkerers drafting on paper, which evolved into CAD and an automated process. With the application of HPC, we are now entering an era where live world systems will have digital twins—a fully digital world. SAIC is working side by side with government engineers to realize actual solutions born from theoretical concepts.

Composite materials are widely used in the aircraft industry today. The development of lightweight, high-temperature resistant composite materials is influencing the next generation of high-performance, economical design for everything from aircraft to consumer goods. SAIC computational scientists assist engineers in designing structures with unique properties, influencing the future of materials and their longevity.

Performance Engineering

Performance engineering optimizes software performance on given hardware without changing the functionality. This often translates to shorter run times and less resources. Shorter run times result in a faster time-to-solution. Consuming less resources saves on costs and frees compute cycles, memory, disk space, etc., for other important mission-critical applications.

Consider large weather modeling software that must run within a small time window to provide an immediate forecast for daily decision-making. SAIC computational scientists help compress the forecast run time and enhance resolution by applying asynchronous I/O threading techniques and other performance engineering guided optimizations.

Data Analytics

Data analytics practitioners, when faced with extreme size of data or extreme complexity of data, now look to HPC to reuse techniques long used in HPC that target parallelism and scalability to conquer problems of grand challenge scales. SAIC is helping non-traditional HPC users access High Performance Data Analytics insights by enabling the creation of data analytics platforms and graphical user interfaces. SAIC provides training to new users on HPDA awareness and application enabling them to break into this new field.

SAIC designed Synthetic Analyst™ to expedite decision-making across the full spectrum of military and federal civilian operations, including threat detection and analysis, course of action planning, training support and headquarters operations. The platform improves as it performs, using machine learning to optimize its speed and effectiveness. Real-time, multi-layered responses are tailored to a user's specific situational knowledge needs, mission objectives and operational experience and conditions. Synthetic Analyst's open and adaptive design allows it to be implemented on any host infrastructure, from smart phones to supercomputers.

HPC Expertise

In the specialized world of HPC, accessing experts or developing the next generation of HPC talent becomes a differentiating capability. SAIC has the experience and capacity to deliver the HPC expertise when you need it, where you need it and at the level you need it.

Our team at the Geophysical Fluid Dynamics Laboratory needs varying degrees of expertise in climate and other natural sciences paired with IT and computer science within HPC applications. We also staff a range of commodity IT professionals who provide overarching infrastructure and administrative support, insulating the climate scientists from the technology so they can focus on research. The result is that SAIC determines and delivers the mix of talent that can best enable the science within the customer's budget.

See back for more details on blogs, case studies, and research on each category.

HPC ENGINEERING

BLOGS	• HPC Helps Hurricane Victims • Digital Twins: HPC Evolving Engineering • Materials Science: The Philosopher's Stone for the 21st Century
CASE STUDIES	• Gaining Insights for the Army Through HPC • Computational Science for DoD • HPC Helps Design Composite Materials for Next Generation Aircraft • Delivering HPC Power to Enhance the F35
RESEARCH	• Deep Learning Evolutionary Optimization for Regression of Rotocraft Vibrational Specturm

PERFORMANCE ENGINEERING

BLOGS	• Where's Waldo: The Importance of Extreme-Scale Analysis • Better Together: Asynchronous Input/Output and Coupled Weather Models • Performance Engineering: Getting the Most from HPC • Materials Science: The Philosopher's Stone for the 21st Century
CASE STUDIES	• Climate and Weather Modeling for NOAA • Navy Uses HPC for Faster, More Accurate Weather Models • Performance Engineering Gains Real-Time Results for Network Modeling
RESEARCH	• Asynchronous I/O with Earth Systems Modeling Framework • Data Movement Opt Using TAU and Threadspotter: FUN3D • Techniques for Optimizing Multi-Physics Combustion Models for Data Parallelism

DATA ANALYTICS

BLOGS	• Ya Gotta Know the Territory: Data Analytics in Climate Modeling • Data, Data Everywhere Without a Way to Sync • Show Your Work: Machine Learning for Vital Missions • 42: High Performance Data Analytics and Finding the "Ultimate" Answers
CASE STUDIES	• Training Data Analytics Users on HPC
RESEARCH	• HPC Enabled Data Analytics for High-Throughput, High-Content Cellular Analysis • Improved Global Weather Prediction with GFDL's FV3 Dynamical Core

HPC EXPERTISE

BLOGS	• Playing Well with Others in HPC • High Performance Collaboration: The Benefits of an HPC ENnovation Center • Beg, Borrow or Steal? The Challenges of Staffing HPC Missions
CASE STUDIES	• Scientific Computing for the Food and Drug Administration

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