

IBM Technical Computing

Accelerate insights and results from vast quantities of a broad array of data



Welcome to the new era of technical computing

All companies want more compute power, faster networks, better access to data and applications available everywhere and at all times. But simply deploying a fast computer without considering all the elements involved in planning, deployment, installation, administration and ongoing maintenance and updates can actually hobble an organization, affecting productivity and possibly damaging profitability and brand value.

Today's technical computing solutions require an end-to-end view of the hardware, operating environment, applications, data management, software and services. It is about the overall system—where purpose-built systems reside next to general purpose solutions to form a compute and systems capability that meets the most demanding requirements. Whether dealing with real-time trading systems, managing the smart grid, optimizing real time customer relationship management across multiple distribution channels, or running computationally demanding electronic design automation workloads, you need more than one size fits all to tackle your unique challenges.

Analyzing big data requires more than fast processors

As technical computing moves towards a data centric model, the ability to deal with large sets of fast-moving structured and unstructured data becomes paramount. Whether analyzing market data to make critical business decisions, or running data-intensive simulations to better understand physical phenomenon, analytic processes must be carried out in ever-shorter time spans to be of value to an organization.

Generating insights from the exploding volume, velocity and variety of data requires optimized systems specifically architected for that task. To maximize performance, systems optimization must be done at every layer of the technology stack to exploit unique processor, memory and storage characteristics. The increasingly sophisticated technical computing workflows require computing tuned to domain knowledge and workload characteristics, hardware with multi-core architectures and advanced threading, and software tuned from the operating system through the middleware stack.

Meeting the challenges of your particular operation

Multi-step, big data analytics also requires optimized workflows—which means organizations can no longer pick a technical computing solution based on a single benchmark, such as a server's maximum processing power or its ability to run a particular workload faster than a competitor's solution. Companies need to examine the various tasks in their big data analytics workflows and match the requirements with suitable technical computing solutions.



With IBM® System x® x86-based solutions and IBM POWER Systems™, IBM Systems Storage®, disk, tape and network storage systems, and advanced software such as IBM SPSS® for predictive analytics and IBM ILOG® offerings for optimization, IBM can offer the right combination of systems to meet the workflow challenges of your business.

Partnering to create a complete solution

IBM has always worked closely with an influential set of Independent Software Vendors (ISVs) who offer application solutions and tools to meet your business needs for technical computing. IBM produces the hardware and the system software, but we rely heavily on ISVs to build the applications and tools that give technical computing systems full value to your organization. We have relationships with ISVs across industries, including Accelrys in the life sciences space, Ansys in the aerospace and automotive industries and Magma for electronic design automation.

A broad portfolio of superior and innovative products and technology

The IBM vision for technical computing is to bring together technology, science, management and innovation to enable major improvements in business and society—and help build a smarter planet. IBM provides an extensive selection of technical computing options from a portfolio of servers, storage, software, services and financing components backed by access to subject matter experts and world-class support. IBM solutions can help you optimize workloads and overcome obstacles to parallelism and other revolutionary approaches to supercomputing.

Among our broad portfolio of technical computing solutions are highly scalable supercomputers, high-value symmetric multiprocessing (SMP) servers, industry-standard clusters, private cloud solutions, high-speed storage including IBM SONAS, and innovative software tools such as GPFS®.

The sky's the limit

IBM recognizes that one size does not fit all. That's why we introduced the IBM Engineering Solutions for Cloud. Based on proven IBM technology, Engineering Solutions for Cloud let organizations build a centralized, shared product development center that supports both interactive and batch design workloads. This solution enables designers and engineers to access the Technical Computing cloud environment from a laptop practically anywhere in the world, using interactive applications with 2D or 3D remote visualization significantly saving cost and minimizing the amount of data that must be transferred to and from the cloud.

For more than 20 years, IBM has been using grid and cloud technology for its Power chip development process. Since 2009, IBM chip designers have utilized a centralized IBM Electronic Design Automation private cloud located in Austin, Texas, using a remote 2D visualization portal which allows designers to access the cloud from almost anywhere and practically anytime. IBM technical computing systems, storage, cloud management tools, workflows, and methodologies are also key components of this highly optimized solution. Using the IBM EDA private cloud, IBM was able cut designers' IT costs by half, reduce the POWER7 first-pass design time by six months and achieve close to 90% server utilization rates 24 hours per day, 7 days per week for batch and interactive workloads.

Answer: What is helping build smarter hospitals?

On the heels of The IBM Jeopardy! Challenge, in which the IBM Watson system demonstrated a breakthrough capability to understand natural language, advanced analytical capabilities can now be applied on real client challenges. For instance, in health care, IBM has partnered with Nuance Communications, which offers a speech recognition and Clinical Language Understanding package. IBM has also partnered with WellPoint, who will develop and launch Watson-based solutions to help improve patient care through the delivery of up-to-date, evidence-based health care.

Helping a broad array of industries

IBM is helping companies and organizations in more than a dozen industries. We have powerful, innovative solutions to companies' most challenging and complex problems, that allow businesses and researchers to innovate, make critical technical and business decisions, achieve breakthrough results, and establish sustainable competitive advantage.

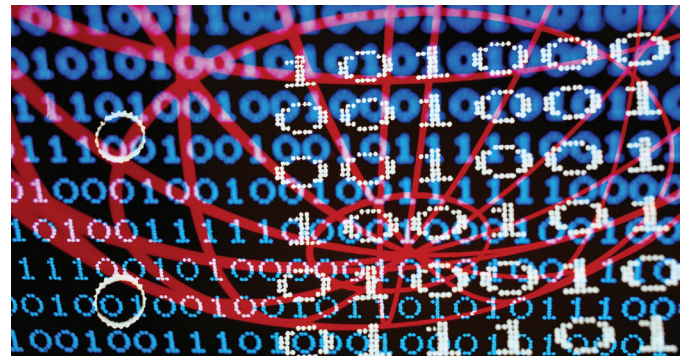
Making sense of dollars

Financial services firms are rethinking their strategies as they respond to the sweeping changes in the markets and the regulatory environment, and an incessant blizzard of data. In fact, some financial organizations consume market data at rates exceeding one million messages per second, twice the peak rates they experienced only a year ago. With an optimized technical computing system from IBM, financial services enterprise can process vast amounts of structured and unstructured data, in real time which means you won't be lost in a data whiteout.

As part of their risk management operations, Italy's Intesa Sanpaolo—one of the top banking groups in the Euro zone—manages multiple terabytes of data each day. In order to process more calculations per day, support new types of risk assessments, integrate information from across its global enterprise and better comply with revised government regulations for risk management reporting, the institution relies on IBM technical computing solutions. The bank has deployed a unified high-availability environment connecting two IBM Intelligent Cluster™ systems with System Storage and IBM General Parallel File System (GPFS™) to deliver high-speed parallel access to volumes of data and manage thousands of risk scenarios a day—with room to grow.

Engineering a smarter planet

Meeting the demands of today's automotive, aerospace, defense and manufacturing engineers requires unprecedented computing power for structural analysis, noise, vibration, and harshness tests, crash analytics, and fluid dynamics. IBM offers computer aided engineering (CAE) optimized solutions that include systems, storage and software, from leading ISVs to help you streamline your development environment, reduce design-cycle times and infrastructure costs, and meet aggressive time-to-market deadlines.



Precise placement of a wind turbine can affect its performance and its useful life. For Vestas Wind Systems, the world's largest wind energy company, gaining new business depends on responding quickly and delivering business value. To succeed, Vestas uses System x iDataPlex® along with IBM GPFS and the IBM InfoSphere® BigInsights to slice weeks from data processing times and analyze 10 times the amount of data for more accurate turbine placement decisions. Improved precision provides Vestas customers with greater business case certainty, quicker results and increased predictability and reliability in wind power generation.

Searching for black gold

A tectonic shift is underway in upstream petroleum computing. Reservoir modeling and sensor field data now interact in near real-time to dramatically improve the fidelity of the analysis, its accuracy, and reliability. With IBM technical computing systems, energy companies can reduce the duration and cost of problem solving in reservoir optimization and seismic imaging, continuing to advance the field of exploration and production.

Tricon Geophysics, a processing, seismic imaging and reservoir characterization company that provides 2D and 3D seismic imaging for the oil and gas industry uses System x iDataPlex to process larger and more complex geophysical data sets within shorter timeframes. Faster computations allow Tricon's customers to find new oil reserves faster and with a greater degree of certainty, all while minimizing the need for costly exploratory drilling.

A dose of high performance technical computing

Whether it is mapping the human genome, investigating medical therapies, replicating brain power, or pinpointing tumors, breakthroughs with IBM technical computing systems are helping researchers explore new frontiers in biology. IBM delivers an integrated computing environment that optimizes the data flow and computing power for key applications and algorithms. When implemented, this solution can help reduce costs and significantly shorten the duration of research, development and discovery initiatives.

The University of Medicine and Dentistry of New Jersey (UMDNJ) wanted to expand its capabilities as a research university. UMDNJ worked with IBM to deploy an System x iDataPlex which it now uses for an array of experiments in such fields as molecular dynamics and genomics. One project is focused on exploring advanced statistical methods to examine protein structure prediction, while another is modeling drug-modulated breast cancer growth. A research project for the dental school is exploiting the power of IBM's technical computing system to examine the biochemical mechanisms involved in ligand dentin bonding.

The ability to run typical compute jobs in parallel boosts productivity for researchers and speeds analysis. For East Carolina University, greater computational performance and throughput means a greater ability to make a positive impact on evolutionary sciences. To do this, the university relies on an Intelligent Cluster and Datatrend, an IBM Business Partner, who deployed the system and helped the university compile several of its existing codes for the new architecture. Now jobs that used to take a day are completed in a matter of minutes, including next-generation DNA sequencing.

Community collaboration

Complete technical computing solutions may require components supplied by specialized vendor such as applications and tools from ISVs, hardware for interconnection and acceleration of processing nodes, and state-of-the-art cooling technology for greener operation, to name a few. IBM maintains technical and business relationships with all the leading technical computing providers.

IBM also works closely with industry, open standards consortia, and government agencies around the world to facilitate technology advancement and deployment, and collaborates with leading academic institutions through our shared university research programs and fellowships. Such collaborations drive value back to the community and result in improved products.

Using insight to help support a smarter planet

Whether optimizing traffic flow to lowering fuel consumption and time wasted in traffic jams, or unraveling genetic codes to develop new medicines and therapies, or increasing the production of oil and gas from existing reservoirs, powerful and efficient technical computing solutions from IBM provide a foundation to handle the associated computational challenges and extract intelligence from complex systems of instrumented and interconnected people and devices.

For more information

To learn more about IBM Technical Computing solutions, please contact your IBM marketing representative or IBM Business Partner, or visit the following website(s):

ibm.com/deepcomputing

Additionally, IBM Global Financing can help you acquire the IT solutions that your business needs in the most cost-effective and strategic way possible. We'll partner with credit qualified clients to customize an IT financing solution to suit your business goals, enable effective cash management, and improve your total cost of ownership. IBM Global Financing is your smartest choice to fund critical IT investments and propel your business forward. For more information, visit:

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