HPC and HPDA for the Cognitive Journey with OpenPOWER

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Executive Summary

Big Data has become characteristic of every computing workload. From its origins in research computing to use in modern commercial applications spanning across industries, data is the new basis of competitive value. The convergence of High Performance Computing (HPC), Big Data Analytics, and High Performance Data Analytics (HPDA) is the next game-changing business opportunity. It is the engine driving a Cognitive organization with Data as its fuel.

But the volume, velocity and variety of data are creating barriers to performance and scaling in almost every industry. To meet this challenge, organizations must deploy a cost-effective, high-performance, reliable and agile infrastructure to deliver the best possible business and research outcomes. This is the goal of IBM's data-centric design of Power Systems and solutions from the OpenPOWER Foundation for HPC and HPDA.

Businesses are investing in HPDA to improve customer experience and loyalty, discover new revenue opportunities, detect fraud and security breaches, optimize research and development, mitigate financial risks, and more. HPDA also helps governments respond faster to emergencies, improve security threat analysis, and more accurately predict the weather – all of which are vital for national security, public safety and the environment. The economic and social value of HPDA is immense. It is also integral to the journey towards a Cognitive and Learning business—a business that utilizes hardware and software designed to learn from its own information, continuously evolve, and return the most insightful, actionable results.

A key underlying belief driving the OpenPOWER Foundation is that focusing solely on microprocessors is insufficient to help organizations overcome performance barriers. System stack (processors, memory, storage, networking, file systems, systems management, application development environments, accelerators, workload optimization, etc.) innovations are required to improve performance and cost/performance. IBM's data-centric design minimizes data motion, enables compute capabilities across the system stack, provides a modular, scalable architecture and is optimized for HPC and HPDA.

Real world examples of innovations and performance enhancements resulting from IBM's data-centric design of Power Systems and the OpenPOWER Foundation are discussed here. These span financial services, life sciences, oil and gas and other HPC/HPDA workloads. These examples highlight the need for clients (and the industry) to evaluate HPC systems performance at the solution/workflow level rather than based on narrow synthetic point benchmarks such as LINPACK that have long dominated the industry's discussion.

Clients who invest in IBM Power Systems and high-value offerings from the OpenPOWER Foundation could lower their total cost of ownership (TCO) with fewer, more reliable servers compared to alternatives. More importantly, these customers can accelerate performance and time to insight in their journey to become a Cognitive business.

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