Open platform for database-as-a-service (DBaaS) on IBM Power Systems solution

A modern, optimized platform for the cognitive era

Highlights

- Faster time to value and improved productivity

- Superior performance and price-performance

- Fully open with no vendor lock-in

- Flexible with choice of most popular open source databases, on demand

- Enterprise-grade foundation for compliance

Competing in a data-driven insight economy, businesses are confronted by a deluge of data from a wide variety of sources—internal, external, social, mobile and sensors. It's estimated that 80 percent of that data is unstructured, and this unstructured data is growing at 15 times the rate of structured data.[1]

Traditional enterprise computing, with its reliance on conventional databases designed for structured data, is unable to cope with this deluge. That's why organizations everywhere are modernizing their data platforms, using all available technology, to derive patterns and insights from both structured and unstructured data. Next-generation applications based on open source technology, and especially open source databases, are critical for this modernization.

Open source software enables companies to benefit from the expertise of the entire open source community. That's why open source downloads are increasing by 80 percent each year, and 70 percent of new applications are built on open source databases.[2]

Open platform for database-as-a-service on IBM Power Systems solution puts you back in control

Open source database-as-a-service (DBaaS) has unique advantages over traditional database deployment models. One, it improves speed and agility with on-demand and agile provisioning of databases—a requirement for today's cloud workloads. Two, it significantly reduces licensing and infrastructure costs. Three, it eliminates database sprawl generated by the hundreds or thousands of underutilized or unutilized databases that have accumulated over the years in organizations.

The open platform for DBaaS on IBM Power Systems solution is an open-source-based platform that integrates servers, storage, operating systems, middleware and databases, disrupting conventional x86-based solutions with substantial ease-of-use and administration benefits, as well as price-performance advantages. It combines three elements: open source and ISV databases; OpenStack and Ubuntu Linux distribution and support; IBM OpenPOWER System LC servers, networking, storage, services and support. See Figure 1.

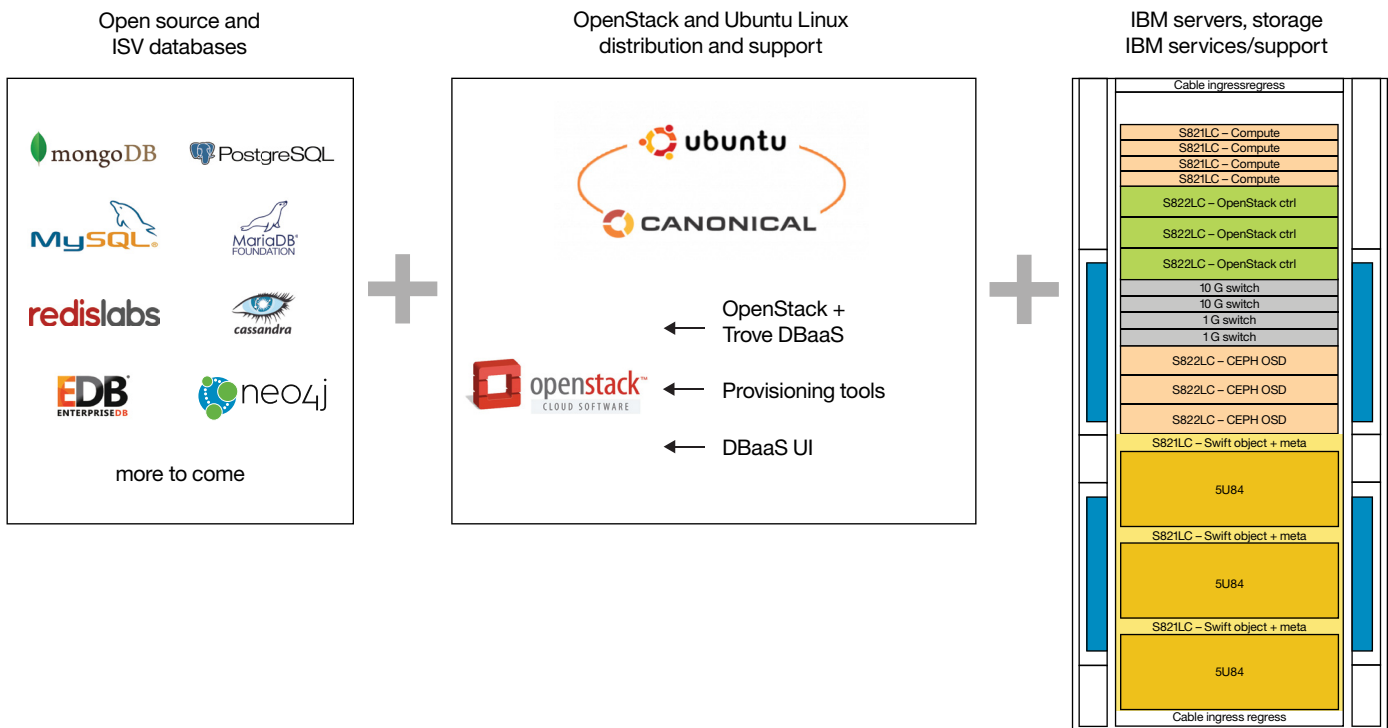## Open platform for DBaaS on IBM Power Systems

Figure 1: Open platform for DBaaS on IBM Power Systems

Modern and mature open source databases, such as EDB Postgres, based on PostgreSQL, and MongoDB, are hardened for enterprise deployments and have innovative new capabilities beyond those of traditional enterprise databases. For example, healthcare organizations are using MongoDB to build new customer call-center applications that combine traditional patient billing data with new data formats, such as MRIs and lab test results. They are also using text data from specialist appointments to significantly reduce patient wait times and improve quality of care. Other organizations are using open source database management systems to combine GPS location data with real-time social media and video feeds with their own data to offer public transportation alternatives during peak travel times.

IBM Power Systems are ideal for open source DBaaS

Open source DBaaS is only as good as the engine driving it. It's critical to have robust, high-performance infrastructure that's optimized for data-intensive workloads. Next-generation developers require all this plus extreme flexibility and scalability, while IT seeks to lower costs per unit of compute, storage and bandwidth.

The IBM OpenPOWER System LC server portfolio was codeveloped by IBM and OpenPOWER Foundation members to help deliver better data-centric innovation around IBM Power® architecture. OpenPOWER System LC servers integrate virtually seamlessly into data centers and clouds to scale data-intensive workflows with maximum performance and minimum cost and server footprint. This integration frees up organizations to focus on solving critical business challenges and accelerating innovation.

The exponential growth of data demands not only the fastest throughput but also smarter networks. Mellanox intelligent interconnect solutions incorporate advanced acceleration engines that perform sophisticated processing algorithms on the data as it moves through the network. Intelligent network solutions greatly improve the performance and total infrastructure efficiency of data-intensive applications.

As part of the open platform for DBaaS on IBM Power Systems solution, IBM delivers Ansible scripts to support OpenStack Trove-based DBaaS installation and configuration on Power Systems servers, storage and networking. Pre-tested reference architectures are provided in four configurations that are designed for varying levels of client needs: starter, entry, enterprise and performance configurations. Each configuration includes appropriately sized compute, storage and networking hardware, and IBM Lab services and tooling, for a complete solution deployment. IBM also provides multiple options and configurations to extend the open source DBaaS platform across private or public clouds.
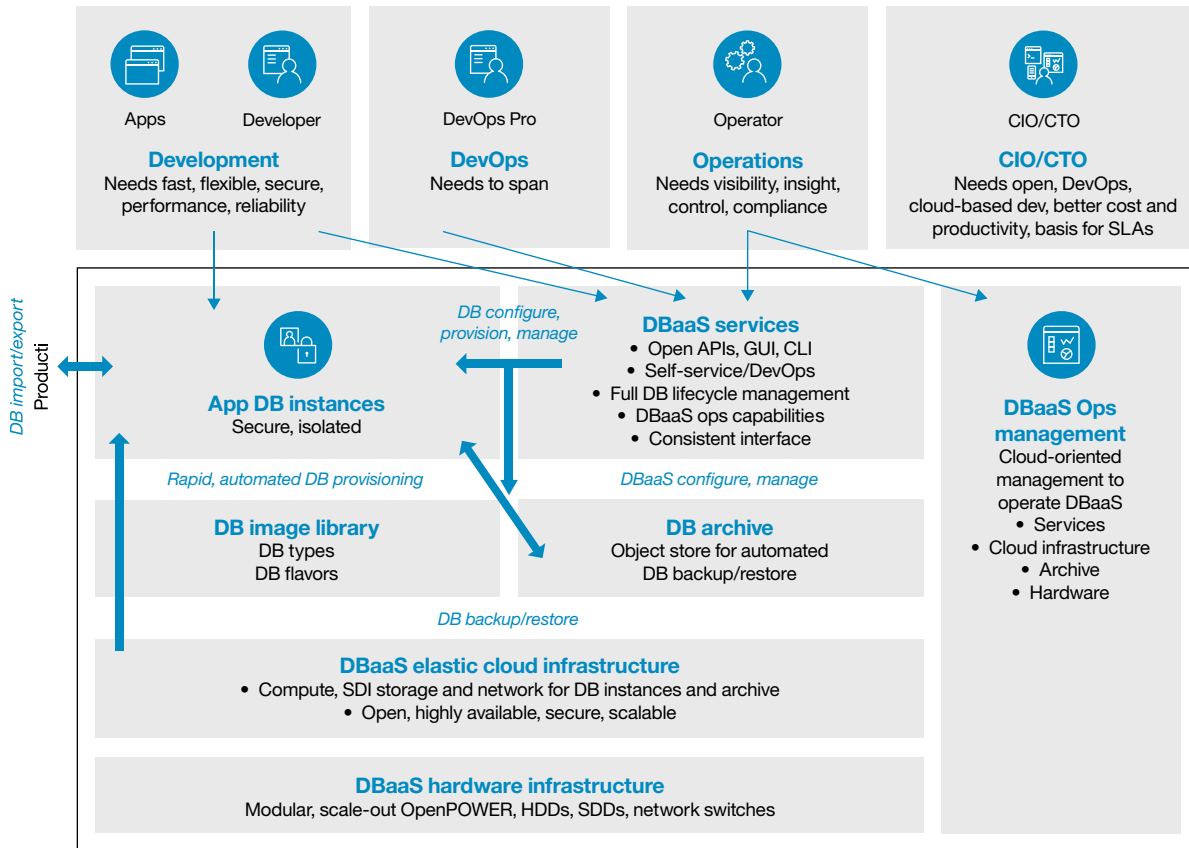
High-level architecture

Figure 2: Open platform for DBaaS

Benefits and features of the open platform for DBaaS on IBM Power Systems solution

Figure 2 illustrates how the open platform for DBaaS on Power Systems solution is designed to address the diverse enterprise requirements for the following three principal stakeholders:

- Developers who need fast, flexible and secure performance and reliability as they work on multiple applications using multiple operating systems and databases
- DevOps and operations staff who manage and control database allocation and services
- The CIO and CTO and other line-of-business managers concerned with optimizing return on investment

Benefits of the open platform for DBaaS on IBM Power Systems solution

For developers	For DevOps and operations	For CIOs and CTOs
Fast: improved client time to value	*Superior cost performance and density: top DB performance for client applications*	*Open: rapid client innovation with no lock-in*
• DBs provided in minutes, not hours or days • Rapid, automated provisioning • Self-service provisioning and lifecycle management	• Up to two times the DB performance advantage with Power Systems solutions • Lower-cost open software-defined storage • More DBs, less servers • Future use of accelerators for added advantage	• Open from the chip up • Open, industry DBaaS APIs • OpenStack, KVM, Linux DBaaS infrastructure
Flexible: client developer choice		*Improved IT productivity: productivity of developers, operators and IT*
• Developers pick the best open DB for their application • Select from menu of popular DB types and flavors • SQL or NoSQL, clustering or no clustering • Tools for clients to add custom DB images	*Foundation for compliance: client control of IT* • Centralized IT control over key DB elements, such as DB types, security and resource usage compared to the current norm of decentralized, ad hoc DB deployment by developers	• Full automation of the DB function • Better IT resource usage through consolidation • Efficient cloud-oriented operational management
Enterprise grade: continuity of the client business	*Modern: client participation in modern environment*	*Integrated: fits the client environment*
• Clustering and replication for DB HA • Auto DB backup and restore with DR options • "Five 9s" data and control plane availability • Security-rich capabilities	• Designed for the as-a-service economy • Self-service • Capabilities to enable DevOps for DBaaS	• Engineered, optimized and tested scale-out solution • Integrates with client's on-premise infrastructure and cloud, bare metal environments • Supports Microsoft Windows, Linux and macOS DB clients

A telecommunications case study

A major telecommunications company has implemented the open platform for DBaaS on IBM Power Systems solution to drive innovation and business value.

Description and challenges	• Developers selected OSDBs and needed ease-of-use, self-service, fast provisioning, support for open source, and cost-effective lifecycle management. • This new solution had to improve the company's existing internal cloud with its home-grown DBaaS for a limited number of OSDBs.
Solution	• Open platform for DBaaS on IBM Power Systems solution–cloud scale reference configuration provided lifecycle management and included open source based, integrated tools for operational management. • Software components included OpenStack Newton (core), Ansible, Trove, Nagios, ELK, MongoDB, Redis and MariaDB. • Hardware components included Power Systems S821LC, Power Systems S822LC and Mellanox switches.
Benefits	• Allowed rapid deployment of various OSDBs without building a separate infrastructure for each • Quickly responded to requests from developers • Provided an easily deployable form factor that can be scaled • Integrated with current open source management tools like Nagios • Provided rapid execution for new apps and enabled DevOps and agile development • Delivered speed of innovation, the primary business driver and benefit

Why IBM and open platform for DBaaS

IBM has more than a 20-year history of supporting open source projects across a broad set of technologies and industries. It's also a founding and platinum member of the OpenStack Foundation, and has consistently contributed significant resources and investments to enable and grow the success of the OpenStack community and code.

IBM Power Systems solutions deliver superior price-performance advantage over x86-based solutions for the leading open source databases, including a 2 times price-performance advantage for MongoDB and a 1.8 times price-performance advantage for EDB Postgres. This advantage not only reduces server and database sprawl, but also frees up precious resources that can be allocated to higher value projects critical to drive innovation for your business.

More information

To learn more about the open platform for DBaaS on IBM Power Systems solution, contact your IBM representative or IBM Business Partner, or visit: IBM modern data platform solutions: **ibm.com**/systems/power/solutions/data-platform/#DBaaS

1 IBM Systems Europe, *Building a modern data platform for cognitive computing*, https://www.youtube.com/watch?v=yuPQ133Hcr8

2 Mason, Stacie, *How your customers can stay competitive with the ideal modern data platform*, 28 February 2017, http://businesspartnervoices.com/stay-competitive-ideal-modern-data-platform

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