

Continuous Availability with the IBM DB2 pureScale Feature

IBM Redbooks Solution Guide

Designed for organizations that run online transaction processing (OLTP) applications, the IBM® DB2® pureScale® Feature provides clustering technology that helps deliver high availability and exceptional scalability that is transparent to applications. DB2 pureScale leverages the industry standard for OLTP scalability and reliability that is set by IBM DB2 for z/OS® and its IBM Parallel Sysplex® architecture and brings a highly scalable architecture to the distributed platform.

The DB2 pureScale Feature is available as an option on IBM DB2 Enterprise Server Edition and Advanced Enterprise Server Edition. This IBM Redbooks Solution Guide provides an overview of the DB2 pureScale Feature, highlights its architecture, and includes a usage scenario.

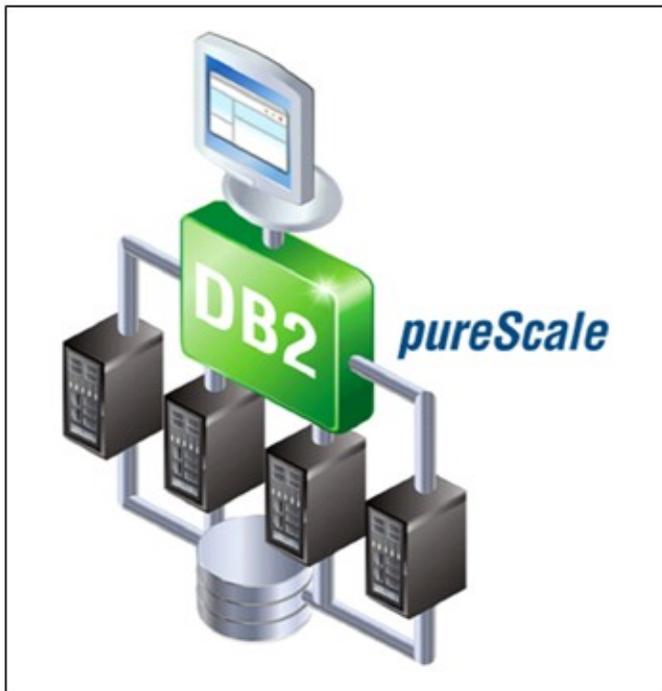


Figure 1. DB2 pureScale featuring extreme capacity, application transparency, and continuous availability

Did you know?

DB2 pureScale is more than just a feature. It is a whole new way to look at DB2 databases. You are no longer limited to a single host to access your data, and you are not required to partition your data so that each host owns a partition. DB2 pureScale provides a clustered solution that uses multiple hosts to access the same data partition, allowing for increased capacity and continuous availability.

Business value

Does your database cluster give you headaches? Is it cumbersome to add a node to your cluster? When you lose a node, does your cluster freeze? Is it difficult to tune your system for optimal performance? If your answer to any of these questions is *yes*, simplify your environment with the scalable database cluster capability of the IBM DB2 pureScale Feature.

DB2 pureScale delivers unmatched levels of database scalability and availability on UNIX or Linux systems, and maintains application transparency:

- **Grow with your business.**

By using DB2 pureScale, your database can continue processing through unplanned outages and take advantage of extreme capacity for any transactional workload. Scaling your system is a matter of connecting a host and issuing two simple commands. With DB2 pureScale, you can scale your OLTP systems to meet the most demanding business needs and control data management costs.
- **Scale up transparently without complex application tuning.**

As application usage grows, the databases must grow in step with application usage to ensure that the business continues operating smoothly and without bottlenecks. DB2 pureScale does not require administrators to perform complex tuning or update application code when scaling the database. The flexible application workload balancing and grouping capabilities of DB2 pureScale allow multiple servers to appear as a single database, and new hosts can be used immediately. This feature helps to reduce deployment complexity and to cut costs.
- **Maintain continuous availability.**

Just a few minutes of downtime for critical applications can significantly damage an organization's bottom line. DB2 pureScale continues operating even if host failure occurs, and it maintains data consistency without performance degradation. Centralized locking and cache management allow the remaining hosts in the cluster to access critical information promptly and quickly absorb the additional workload. No incoming workloads are rejected because the cluster can automatically adjust within seconds. During planned outages, administrators can perform rolling maintenance on individual hosts without affecting the availability of the cluster.
- **Support performance with a clustering architecture that is designed for scalability.**

Designed for high-use clustered servers, the DB2 pureScale architecture helps ensure that applications do not hit a scalability wall after the workload is distributed across more than a few hosts. It can deliver near-linear scalability and maximum throughput, helping to reduce software licensing costs and power and cooling expenditures.
- **Simplify database management with streamlined installation and monitoring.**

DB2 pureScale simplifies database and clustering administration. Hosts can be added to and removed from the cluster easily so that IT staff can scale the cluster up or down quickly to meet changing business requirements. DB2 pureScale also features a single installation process for all software components. One bundle contains all the tools that are necessary for setup, which is automated at installation.

- Take advantage of smooth scaling, which is key to an outstanding customer experience.
The ability to grow transactional databases with customer demand is imperative for companies that are trying to capitalize on new business opportunities. DB2 pureScale can help deliver this scalability and lower costs through extreme capacity, application transparency, and continuous availability.

Solution overview

With an increasing focus on 24x7 availability, companies must be prepared to handle both planned (maintenance) and unplanned outages. In regard to continuous availability, the DB2 pureScale Feature is enhanced to better reflect its capabilities as a clustered database solution (Figure 2).

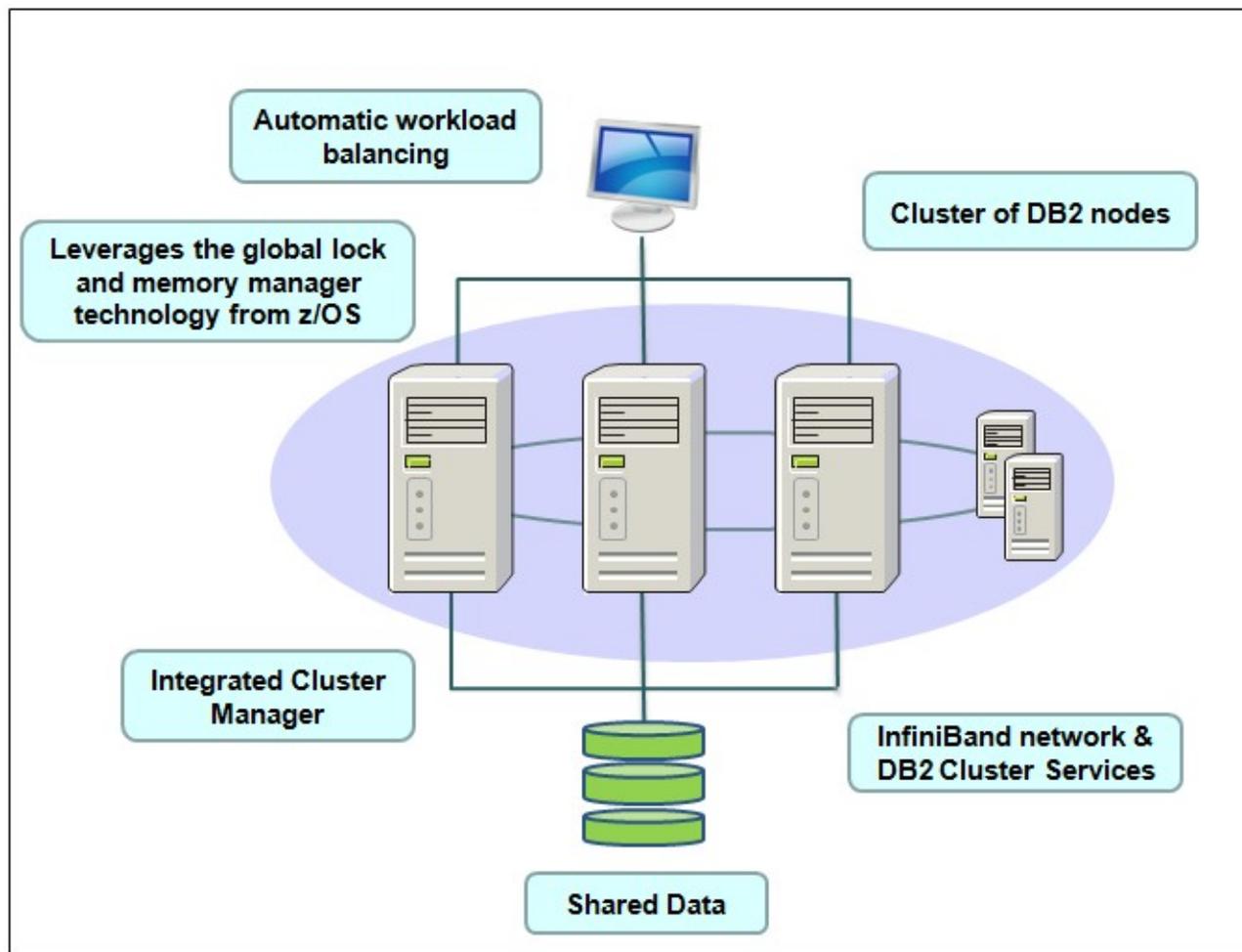


Figure 2. DB2 pureScale architecture

The DB2 pureScale Feature was first introduced in DB2 9.8, which was a DB2 pureScale-only release. DB2 10 builds on DB2 pureScale Feature support, reliability, and performance. In DB2 10, the DB2 pureScale Feature is included in certain DB2 editions and can be installed as a native component. Improvements to supported networks and various performance improvements save database administrators time and resources. DB2 pureScale is available as an option on IBM DB2 Enterprise Server Edition and Advanced Enterprise Server Edition.

You can use the IBM DB2 pureScale Feature to scale a database for a set of servers in an *active-active* approach. Traffic that is intended for a failed node is passed on to an existing node or is load balanced for

the remaining nodes. This DB2 pureScale technology is based on the proven DB2 for IBM z/OS Parallel Sysplex architecture that is recognized as a gold industry standard for maintaining high availability and scalability.

The DB2 pureScale system runs on up to 128 multiple hosts that access shared data simultaneously, without a need to explicitly modify the application. You can use this transparency to perform maintenance operations on hosts, add more hosts, or remove unnecessary hosts, without affecting an application. By using this method, you can control the number of active hosts to handle the workload and to ensure that you remain at the wanted transaction rate.

Solution architecture

A DB2 pureScale instance consists of members and the cluster caching facility (CF) servers. A typical DB2 pureScale environment has four members and two CFs: a primary CF and a secondary CF (Figure 3).

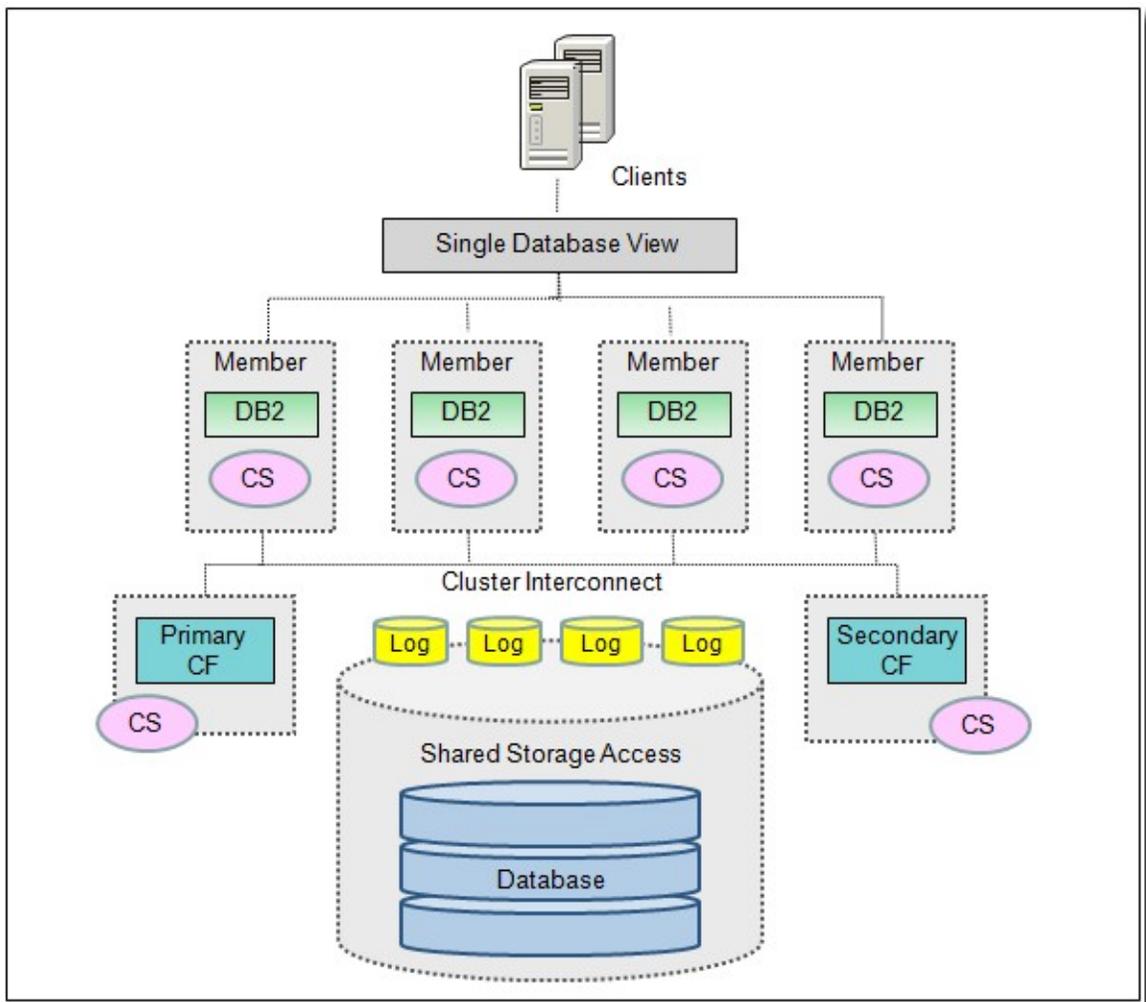


Figure 3. A DB2 pureScale cluster with four members and two cluster caching facilities

DB2 cluster services is a set of subcomponents and services that provide built-in failure detection, recovery automation, and a cluster file system for shared access. The cluster services include other industry-leading IBM software:

- IBM General Parallel File System (IBM GPFS™)
- Reliable Scalable Cluster Technology (RSCT)
- IBM Tivoli® Systems Automation for Multiplatforms

Each member and CF have a cluster service. The cluster service constantly monitors the members and CFs, and it automatically initiates recovery processing if required. The cluster service monitors several resources, including the following examples:

- Access to paths and file systems
- Cluster caching facility server processes
- DB2 processes
- Host computers in the cluster
- Network adapters

Usage scenario

Running Linux on IBM System x® servers provides clients with a cost-effective, reliable, and secure IT environment that can scale with mission-critical workload demands. With DB2 pureScale running on System x, IBM achieved the first clustered database result that was published for the SAP Transaction Banking standard application benchmark in September 2011. The system processed more than 56 million posting transactions per hour and more than 22 million balanced accounts per hour while simultaneously supporting banking industry system availability requirements (Figure 4).

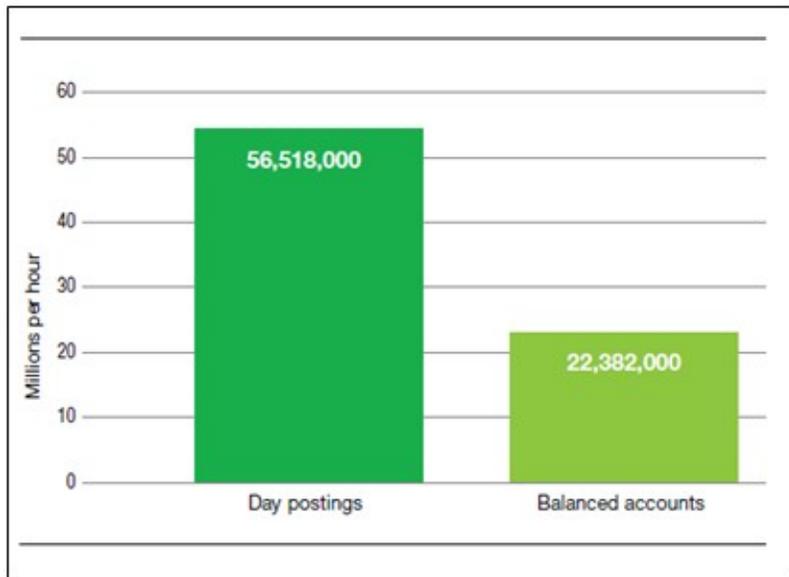


Figure 4. DB2 pureScale postings and accounts processed per hour for SAP Transaction Banking

Integration and supported platforms

A DB2 pureScale cluster consists of various hardware components, including the servers, networking, and storage (Figure 5). Building the DB2 pureScale cluster involves different hardware components, including the servers, storage subsystem, and switches. IBM offers efficient and highly reliable scaling capability across the following leading business computing platforms:

- IBM Power Systems™
- IBM System x Plus

Running on these platforms, DB2 pureScale provides reliability and virtualization features, in addition to cost-effective choices.

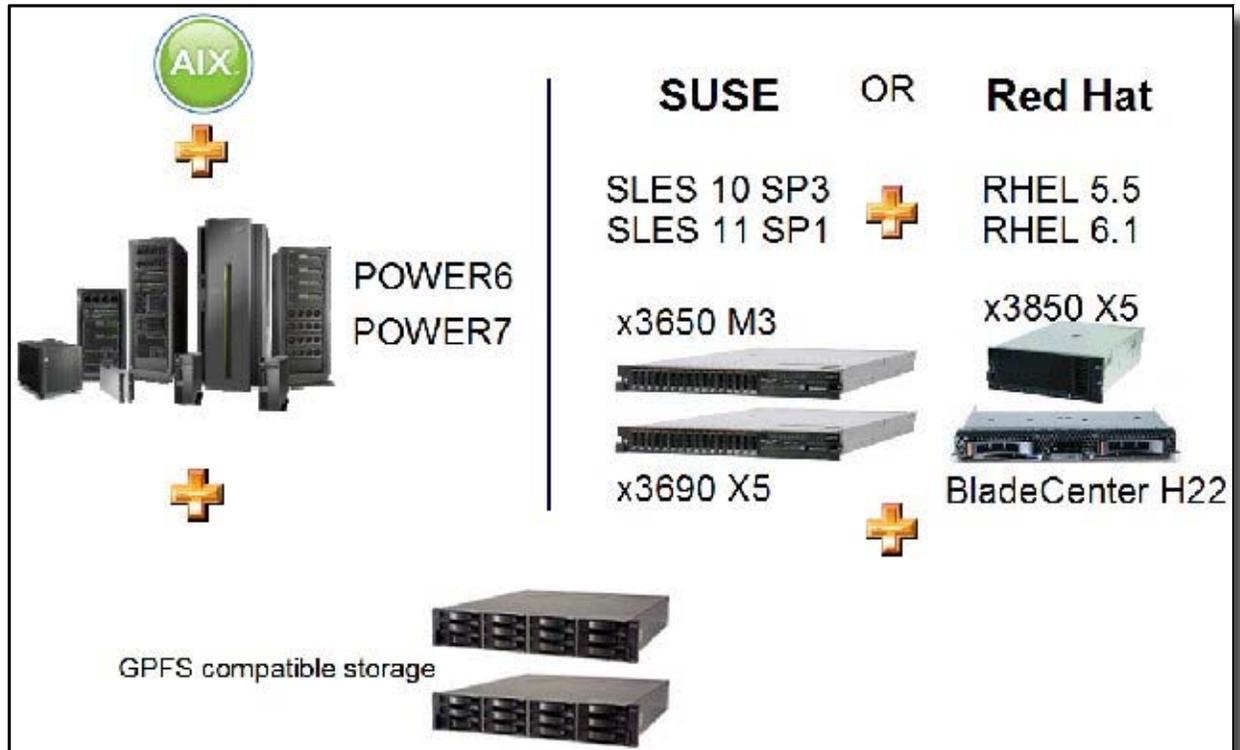


Figure 5. DB2 pureScale Feature support of various hardware and software

For more information about the supported hardware and software, see the "Planning for an IBM DB2 pureScale Feature for Enterprise Server Edition deployment" topic in the DB2 Information Center at: <http://pic.dhe.ibm.com/infocenter/db2luw/v9r8/topic/com.ibm.db2.luw.sd.doc/doc/c0056281.html>

Ordering information

DB2 pureScale is a separately priced feature available in several DB2 product editions:

- DB2 Enterprise Server Edition
<http://www.ibm.com/software/data/db2/linux-unix-windows/edition-enterprise.html>
- DB2 Advanced Enterprise Server Edition
<http://www.ibm.com/software/data/db2/linux-unix-windows/edition-advanced-enterprise.html>

Related information

For more information, see the following documents:

- IBM DB2 Enterprise Server Edition V10.1 Sales Manual
<http://ibm.co/SeBtS2>
- *Unleashing DB2 10 for Linux, UNIX, and Windows*, SG24-8032
<http://www.redbooks.ibm.com/abstracts/sg248032.html>
- *Highly Available and Scalable Systems with IBM eX5 and DB2 pureScale*, REDP-4742
<http://www.redbooks.ibm.com/abstracts/redp4742.html?Open>
- "Introduction to the IBM DB2 pureScale Feature"
<http://bit.ly/R9vP4o>
- *DB2 pureScale: Risk Free Agile Scaling*, ISBN 978-0-07-175240-4
<http://public.dhe.ibm.com/common/ssi/ecm/en/imm14079usen/IMM14079USEN.PDF>

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This document was created or updated on October 31, 2012.

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