



Your data always on with PureData for Transactions

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IBM SWG Technical Sales





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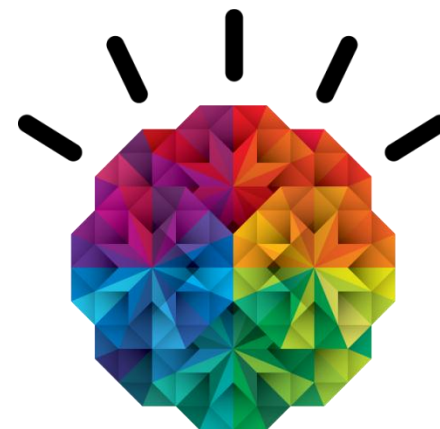
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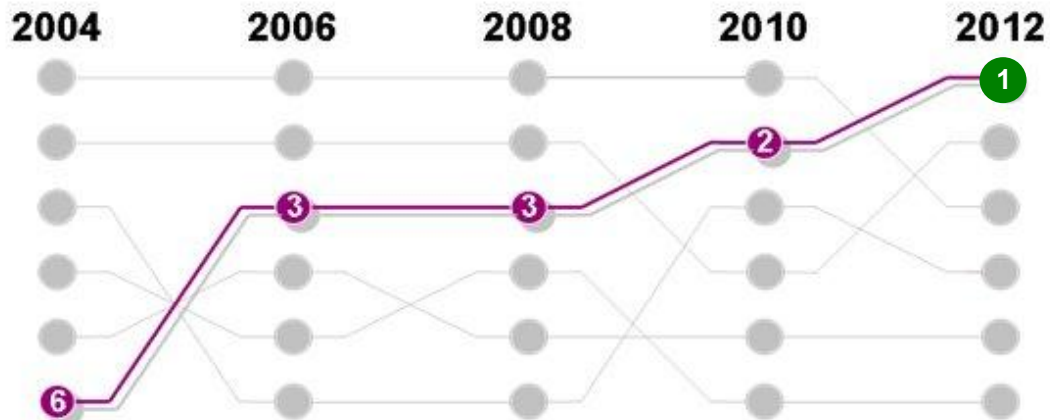
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Agenda

- **IBM PureSystems Family Overview**
- **A closer look at PureData System for Transactions**
 - Key technology concepts
 - Hardware overview
 - Software and tools
- **Using the Management Console**
 - Cluster instance creation and management
 - Database deployment and management
 - Maintenance and system upgrades



Technology is the Leading Force for Impacting Business



Factors impacting organizations:

1. Technology factors
2. People skills
3. Market factors
4. Macro-economic factors
5. Regulatory concerns
6. Globalization

Source: IBM CEO Study 2012

Speed Value

90%

view cloud as critical to their plans



Extended Reach

1 Billion

Smartphones and 1.2 billion mobile employees by 2014

Responsiveness

20B+

Intelligent business assets

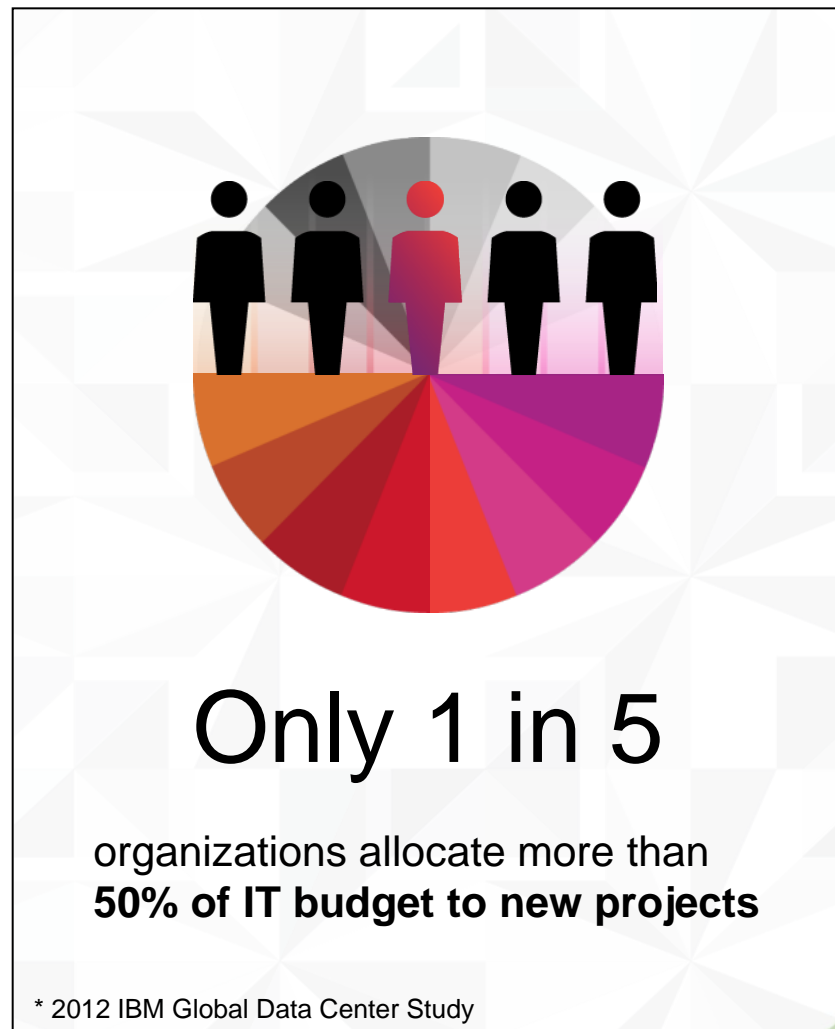
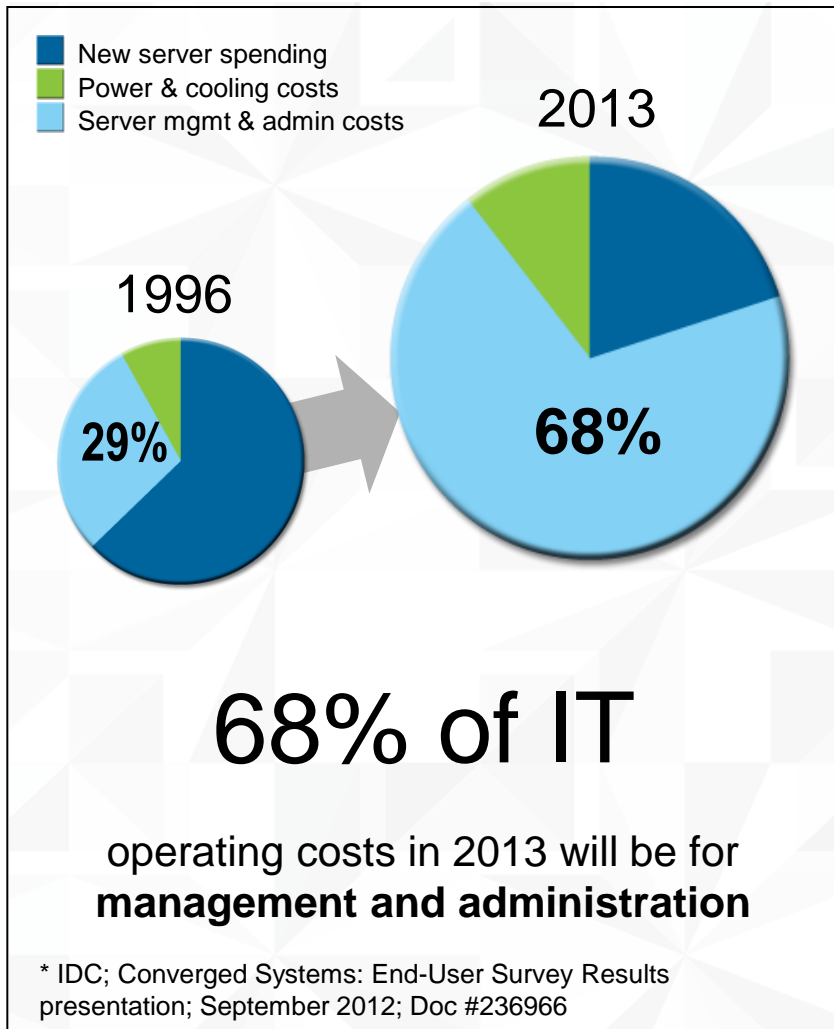


New Insights

2.7zB

of digital content in 2012, up 50% from 2011

Is IT Ready for the Challenge?



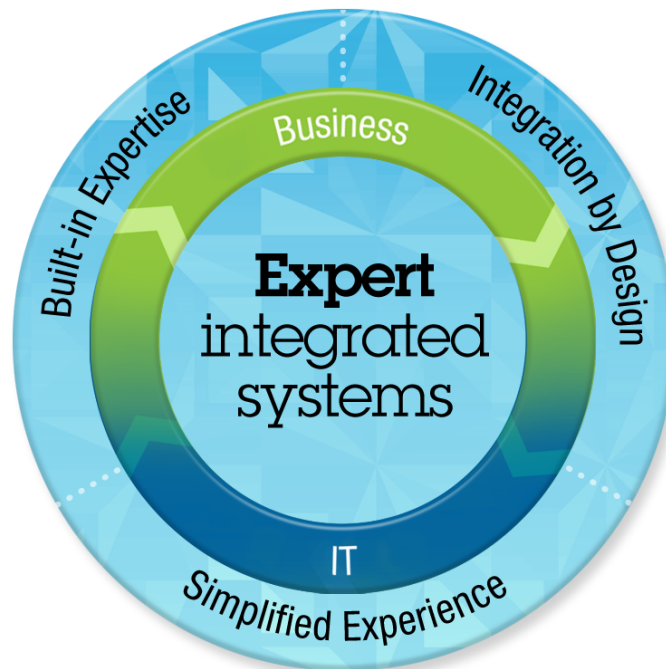
IBM's family of expert integrated systems

PureSystems

Systems with integrated expertise and built for cloud

Built-in Expertise

Capturing and automating what experts do



Integration by Design

Deeply integrating and tuning hardware and software

Simplified Experience

Making every part of the IT lifecycle easier

Smarter systems that meet your challenges by ...

Reducing complexity

The entire system lifecycle is simplified from acquisition to retirement

IT

Accelerating time to value

Management expertise is built in each system and ready for immediate use

Business

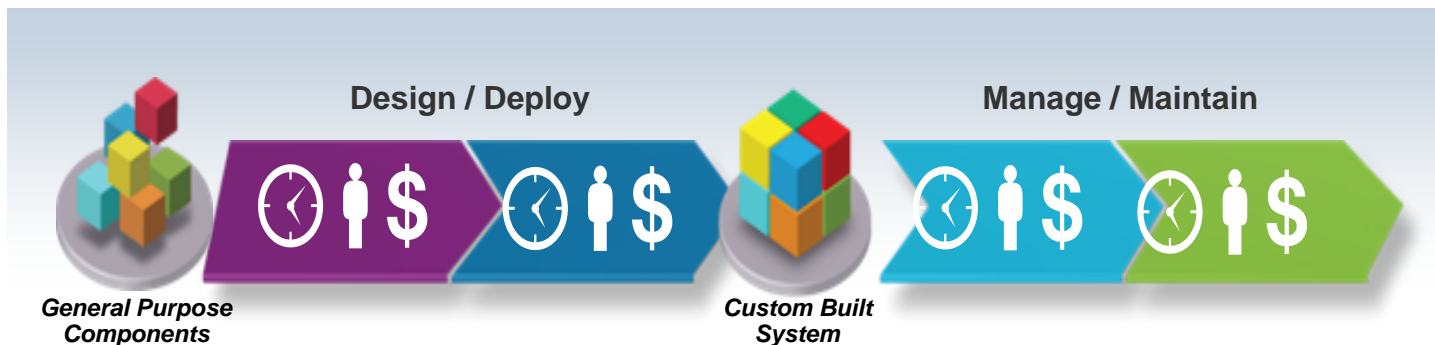
Improving IT economics

Each system tuned for the different needs of different workloads

Financial

PureSystems deliver greater simplicity, speed and lower cost

Today's problem: *Time and effort is spent tuning general purpose components*



The PureSystems solution: *simplifies the entire IT project lifecycle*



Appliances



IBM PureSystems Family: Introducing PureData!

*How much flexibility, integration and workload optimization do you want **out of the box**?*

PureFlex

Infrastructure

Integrated and optimized infrastructure with flexibility

Runs your choice of applications and middleware



- Delivering IT infrastructure services

PureApplication

Application Platform

Integrated and optimized application platform

Built on IBM middleware to accelerate deployment of your choice of applications



- Delivering application platform services

PureData

Data Platform

Integrated and optimized data platform

Delivers high performance data services to transactional and analytics applications



- New PureSystem with models optimized exclusively for data workloads

Different Applications Rely on Different Data Processing

Different appliances for different types of workloads

E-commerce



Customer Analysis



Real Time Fraud Detection



Transaction Processing



Reporting and Analytics



Operational Analytics



IBM PureData System... Meeting Your Data Requirements

Meeting Big Data Challenges – Fast and Easy!



PureData *System for Transactions*

Database services that handle large volumes of transactions with high availability, scalability and integrity

PureData *System for Analytics* *powered by* *Netezza technology*

Data Warehouse services for complex analytics and reporting on data up to petabyte scale - with minimal administration

PureData *System for* *Operational Analytics*

Operational Warehouse services for continuous ingest of operational data, complex analytics, and a large volume of concurrent operational queries

IBM PureSystems... for SAP

Meeting Big Data Challenges – Fast and Easy!



PureData *System for Transactions*

Fully Supported for SAP Applications on
SAP Netweaver 7.0 e.g. ERP
OSS Note 1790400

PureData *System for Operational Analytics*

Fully Supported for SAP BW
OSS Note 1789511

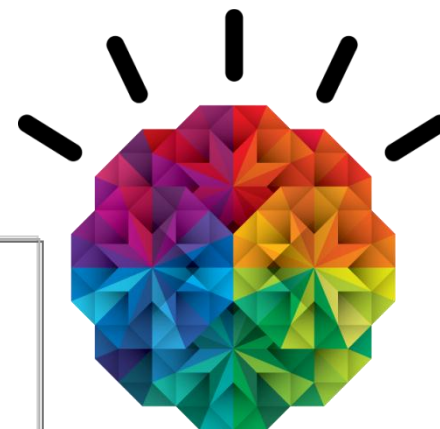
PureApplication

Supported for SAP CRM 7.0 Ehp1 instances
as a virtual application pattern (VAP)

http://www-01.ibm.com/software/brandcatalog/puresystems/centre/details?uid=FC_S_SRRCQ

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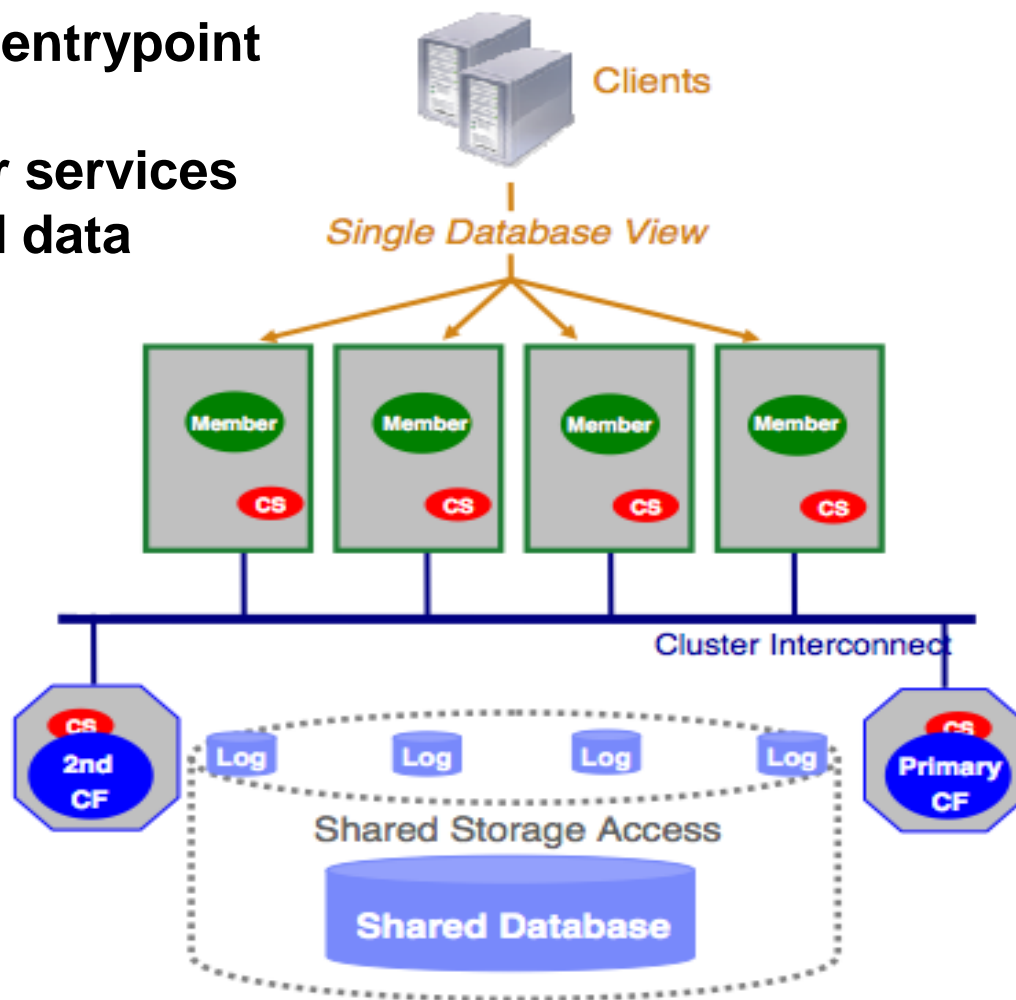
Built with DB2 pureScale Technology

- **Continuous available and scalable database environment with application transparency**
- **Work spread across a cluster of nodes**
 - Acts as a single database system
- **If one node (member) fails, no disruption to work**
 - System *automatically* detects the failure
 - System *automatically* routes work to the other members
 - System *automatically* recovers and restarts the failed member
 - System *automatically* rebalances work across the members by default
- **Additional nodes can be added**
 - Start small and grow



pureScale Architecture

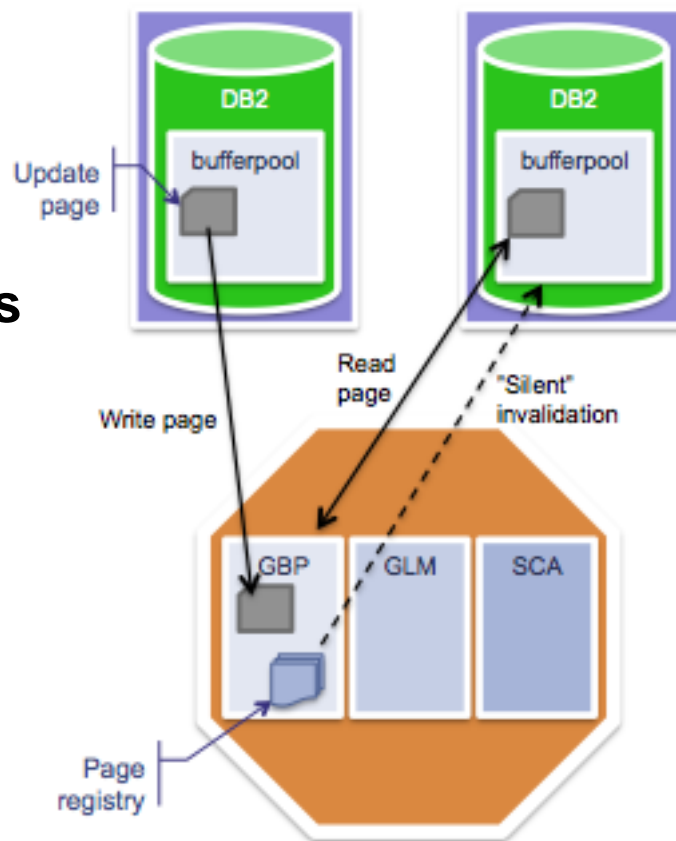
- Single entrypoint
- WLB
- Cluster services
- Shared data



- Members
- Cluster Caching Facility (CF)
- High speed, low latency interconnect
- RDMA
- GPFS

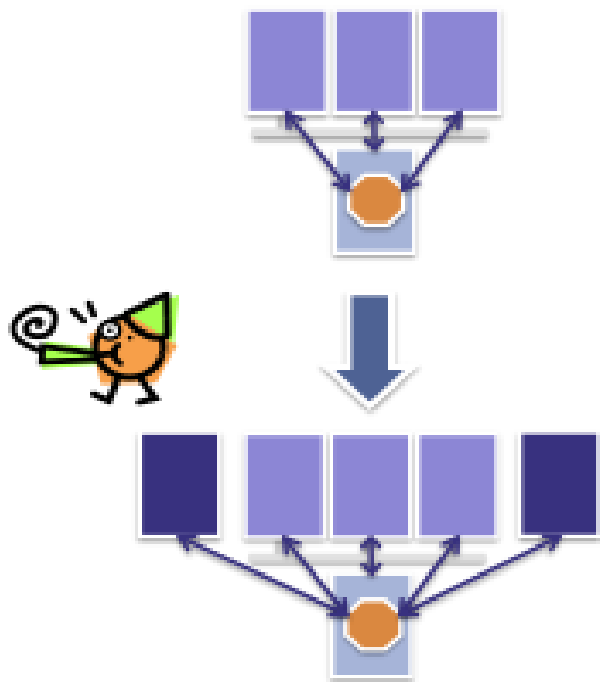
Differentiator - Cluster Caching Facility

- **Centralized locking and caching**
- **Services provided:**
 - Group bufferpool
 - Global Lock Management
 - Shared Communication Area
- **Synchronous duplexing of structures to primary and secondary CF to eliminate single points of failure**

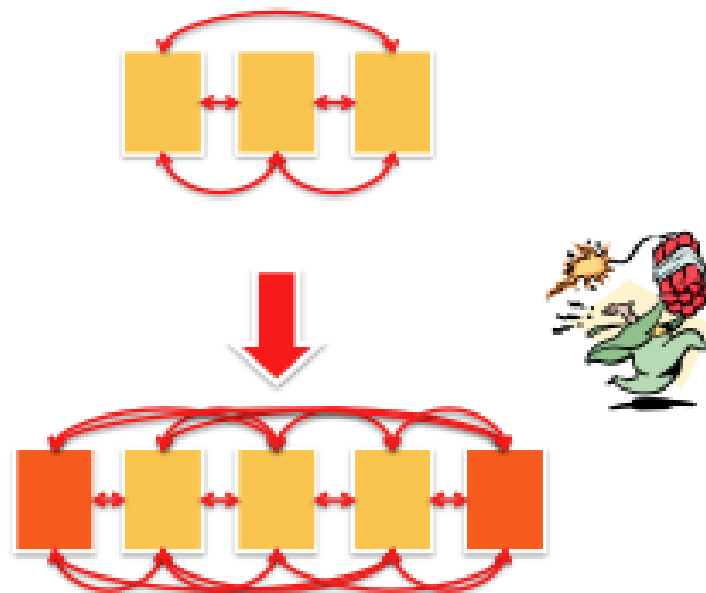


CF versus - Inter-node communication

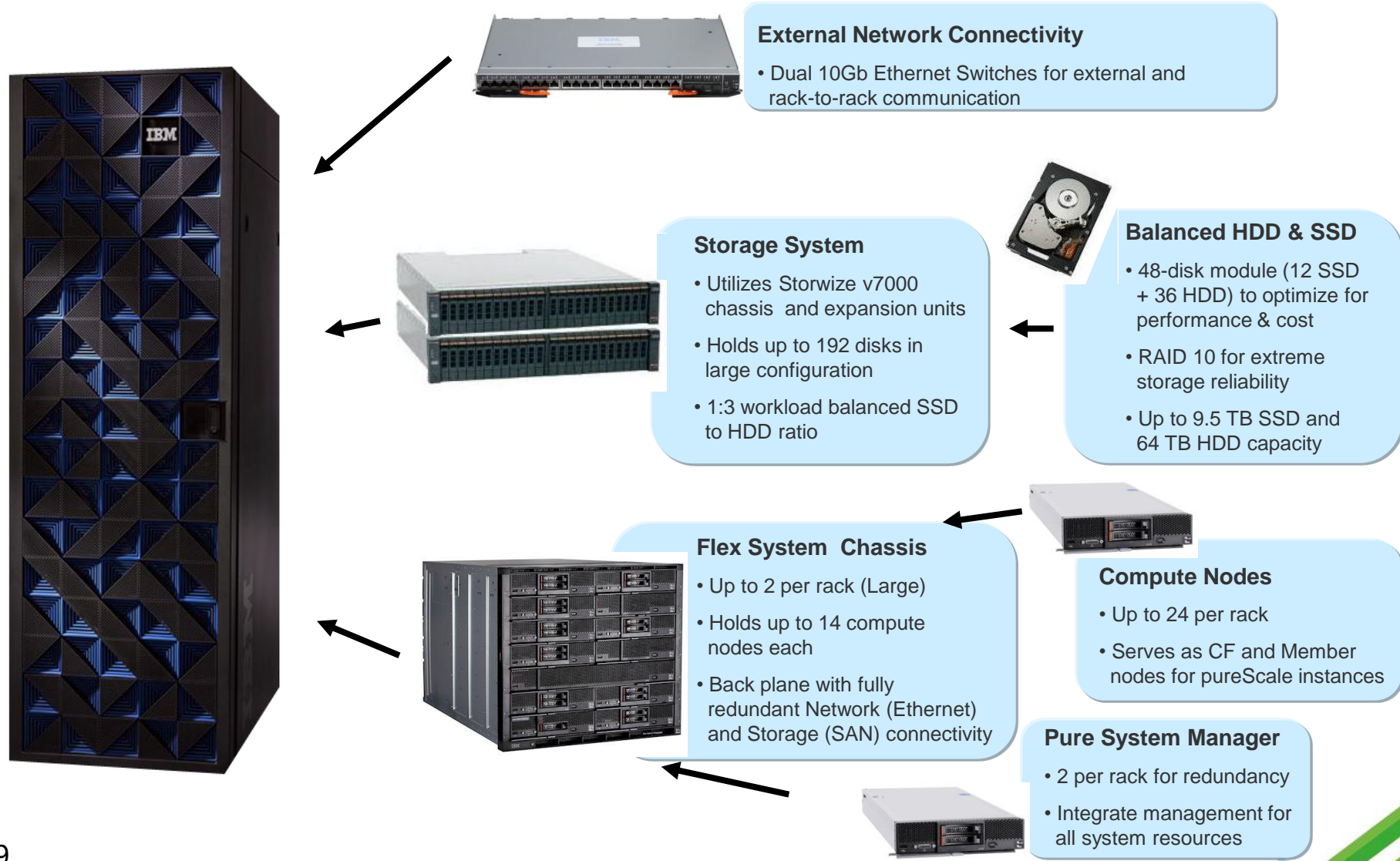
pureScale :
central locking and
memory manager



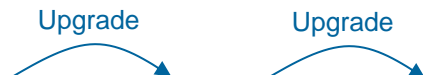
Other DBMS cluster may
require CPU intensive
inter-node communication



Built with Hardware designed for high availability

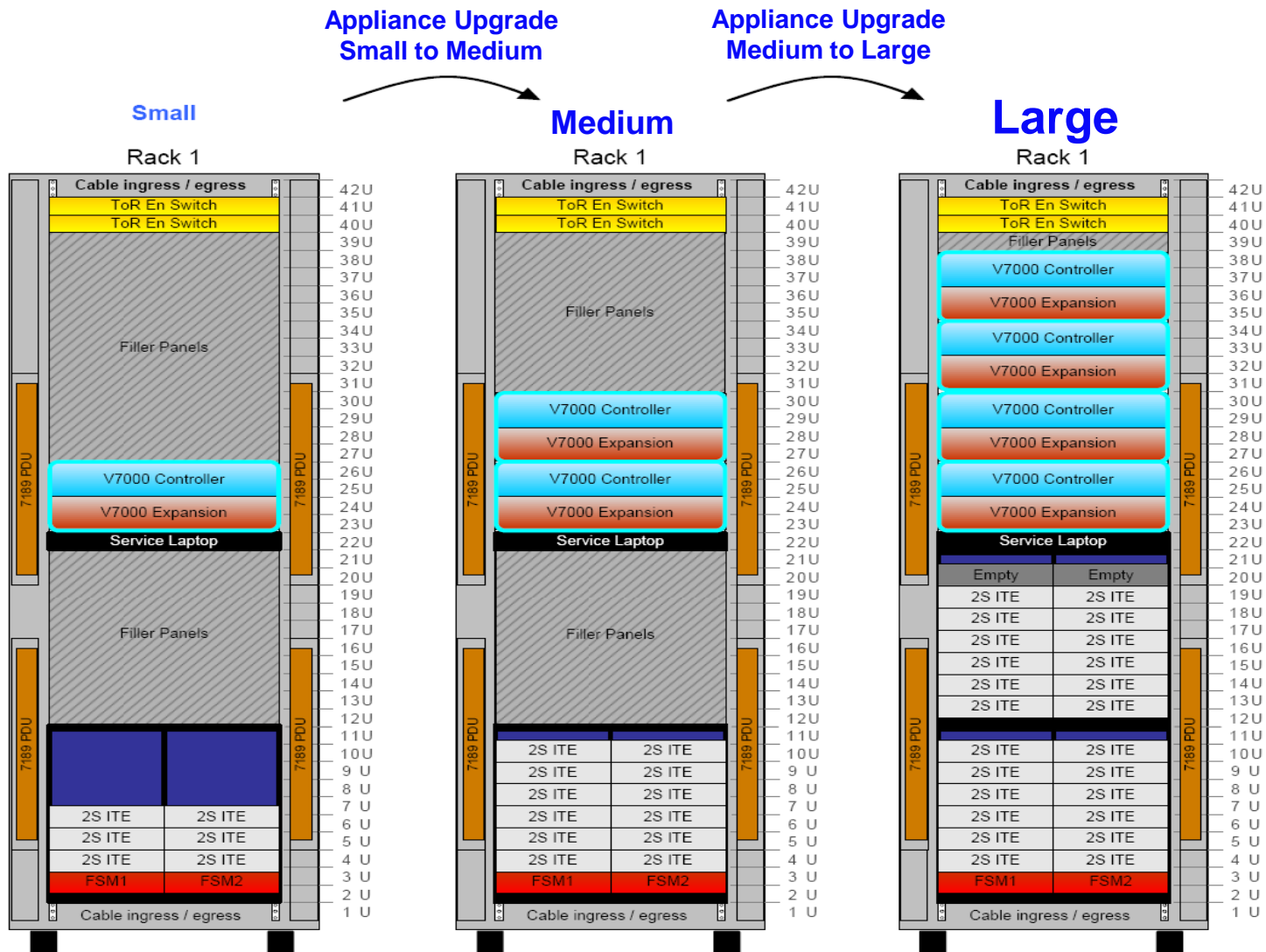


Three Standard Configurations to Choose From



Configurations	T1500-96 (¼ Rack)	T1500-192 (½ Rack)	T1500-384 (Full Rack)
Flex Chassis Module	1	1	2
Compute Nodes (16 cores per node)	6	12	24
CPU Cores	96	192	384
Memory	1.5 TB	3.1 TB	6.1 TB
V7000 Storage Unit (each unit has: 18 x 900GB HDD, 6 x 400 GB SSD)	1	2	4
V7000 Storage Expansion (each unit has: 18 x 900GB HDD, 6 x 400 GB SSD)	1	2	4
User Capacity	18.6 TB	37.2 TB	74.4 TB
Raw SSD Storage	4.8 TB	9.6 TB	19.2 TB
Raw HDD Storage	32.0 TB	64.0 TB	128.0 TB

Hardware Upgrade Paths



Simplified deployment with built-in expertise

Deploy clusters in an hour and databases in minutes using patterns

SGEN

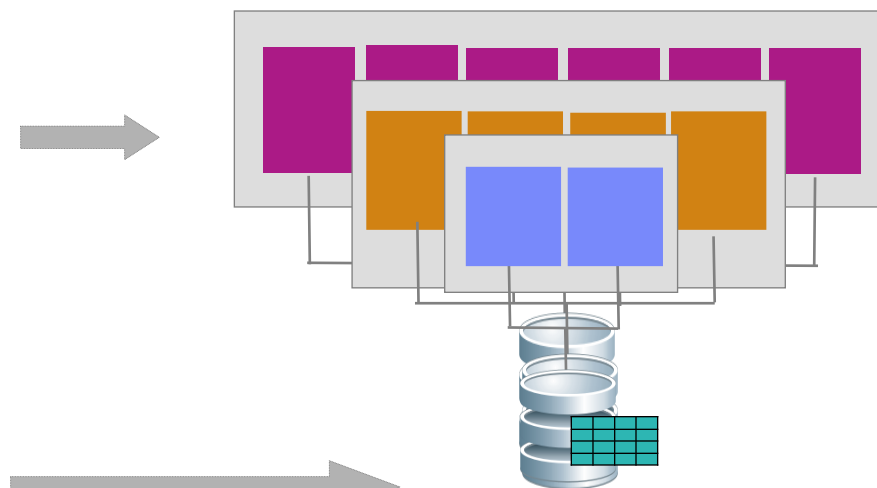
System Console configuration (“SGEN phase”)

Cluster patterns

Automatically creates, configures and deploys a database cluster topology with built-in redundancy and high performance

Database patterns

Automatically creates, configures and deploys IBM-defined or client-specified databases optimized for transactional workloads



Deploy Complete Database Systems in Hours

IBM PureData System For Transactions



IBM + Customer

Includes (at no additional cost):

- ✓ Set-up and configuration
- ✓ System ready for database load

Designed to be up and running in hours

Traditional systems - build it yourself

Versus

PureData System for Transactions - built-in

Over several days/weeks:

1. Define High Availability topology
2. Configure HW/SW/Network
3. Set up storage pools
4. Install multiple operating systems
5. Install instance
6. Set up management tooling
7. Create and configure databases
8. Set up backup processes
9. Test, tune, reconfigure...

In minutes:

1. Just specify cluster name, description and topology pattern

Software Stack

■ Compute Nodes

- Red Hat Enterprise Linux 6.2
- IBM DB2 Enterprise Server Edition 10.1 FP1, plus
 - pureScale Feature
 - Storage Optimization Feature
 - Workload Management
- TSM for policy-based backup and restore



Bare metal install
(no virtualization)

■ Pure System Manager Nodes

- Optim Performance Manager (OPM)
- Data Studio
- IBM Workload Deployer (IWD)
- System Console
- +++

IBM PureData System for Transactions

Optimized exclusively for transactional data workloads!

PureData
System for Transactions

*Delivering data services
for transactions*



Speed

- Industry leading DB2 performance
- Database node recovery in seconds¹

Simplicity

- Database deployment in minutes, not hours¹
- Capable of running multiple database software versions
- Handles more than 100 databases on 1 system²
- No planned downtime for firmware / OS upgrades¹

Scalability

- Scaling up to 30x³
- Designed to expand from small to medium to large configurations with no system downtime

Smart

- Supports Oracle Database apps with minimal change; supports DB2 applications unchanged
- Clients have experienced cases of 10x storage space savings via Adaptive Compression⁴

Footnotes:

1. Based on IBM internal tests and system design for normal operation under expected typical workload. Individual results may vary.
2. Based on one large configuration.
3. Based on the designed minimum and maximum processor and memory resources required for a single database.
4. Based on client testing in the DB2 10 Early Access Program.

Built on DB2 V10

Simplified database administration using DB2 V10.1

Self-balancing

Data access requests automatically load balanced for optimal performance

Self-tuning

Memory management dynamically balances resources

Self-optimizing

Best data placement and access automatically selected based on usage statistics for optimal performance

Self-monitoring

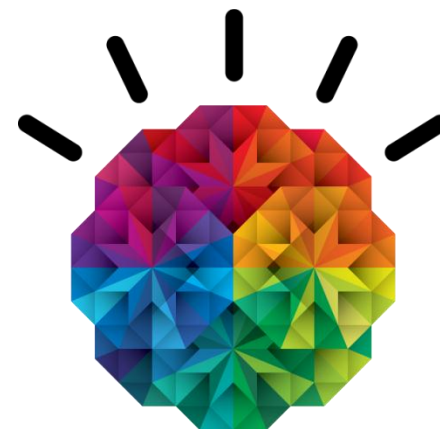
Based on thresholds and alerts, system will monitor and automatically make changes as needed to improve performance

Self-healing

Failed database nodes are isolated and recovered automatically

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Simplified experience through integrated console

The screenshot displays the IBM PureData System for Transactions console interface. At the top, it shows navigation tabs for 'Workload Console' and 'System Console', along with user information 'Default Admin' and 'Logout'. The main header reads 'IBM PureData System for Transactions'. Below this, there are sections for 'Setting up your database clusters' and 'Working with databases', including a 'Step 1: Create a database' wizard. The central part of the console features 'Virtual Machine Monitoring' with graphs for Memory, CPU, and Disk usage. The bottom section provides a detailed 'Performance' dashboard with various charts and tables:

- Data Server Runtime:** Total Time (%) for User (DB2) at 49, Statement Processing at 27, User (non-DB2) at 20, System (DB2) at 24, System (non-DB2) at 9, I/O at 4, and Idle at 4.
- DB2 Time (%):** Statement Processing at 27, Sort at 17, Commit at 21, I/O at 12, Locking at 10, WLM Queue at 6, and Other at 9.
- Data Server Throughput:** Throughput / minute (Request: 20000, Statement: 15000, Transaction: 5000), Row Throughput / minute (Rows selected: 50000, Row read: 250000), Connections (#) (Active: 500, Total Open: 880), and Avg Statement Response Time (ms) (Smp: 100ms, 75).
- Partition Skew (rows read / partition):** Minimum: 20000, Average: 15000, Maximum: 5500.
- Performance focus:** Buffer Pool Hit Ratio (%) at 60, Physical and Logical Reads / minute (Physical reads: 4000, Logical reads: 9000), % Asynchronous Read/Write / minute (Asynch writes: 53, Asynch reads: 65), Pages / minute (Direct writes: 0, Direct reads: 0, Cleaner writes: 432, Prefetcher reads: 3300), and I/O Time per I/O Operation / minute (Synch read/write: 25 (W), 89 (R), Direct read/write: 0 (W), 64 (R), Pooled read/write: 4 (W), 1 (R), Log read/write: 1 (W), 1 (R)).
- Top 3 SQL Statements:** Lists SQL queries such as 'SELECT * FROM (SELECT PEL_ID, PRL_CURRENTVALUE, PRL_MAXMINVALUE, PRL_PSTD, PRL_THRESHOLD, PRL_STOPVAL, PRL_PSTD_ID, ...' and 'WHERE D.PELD_PRL_ID = L.PEL_ID AND PELD_COUNTER ...'.

- **Single console to manage all resources and work running on the system**
 - Consistent IBM PureSystems console

- **Role-based security and tasks**
 - Management
 - Monitoring
 - Maintenance

- **Easy integration with broader enterprise monitoring tools and processes**

System Console – Easily monitor hardware

The screenshot displays the IBM PureData System for Transactions System Console. The top navigation bar includes 'Workload Console' and 'System Console'. The 'Hardware' tab is active, showing a 'Infrastructure Map (Graphics View)'. The map displays a rack of server units with various status icons (Critical, Warning, LED, Temperature, Performance) and utilization percentages. A detailed information panel on the right provides the following data for 'Rack 1 Node Bay 1':

Power status:	Power On
Energy information:	Input power range: -
Service processor level:	BOBT001 - Not Available - 7.30
Unified extensible firmware interface/a level:	
Machine type:	7891
Location:	Rack 1 > Chassis 3 > Node Bay 1
In database instance:	db2inst1
Hypervisor version:	AIX 6.1 6100-00-00-0000

The 'Overlay' section shows the following metrics:

Error:	
Warning:	0
Normal:	
CPU:	5.0%
Memory:	4.7%
Temperature:	
Power:	true
Event:	
Location:	
Fault:	

System Console – Easily monitor storage

IBM PureDatabase System | Workload Console | System Console | Default Admin | Help | About | Logout

Welcome | Cloud | **Hardware** | Reports | System

Storage Devices

Search...

- Storage Node
78G033V @ Rack 8283/12345 > Unit 35
- Storage Node Expansion
78G04Y6 @ Rack 8283/12345 > Unit 33

Storage Node

Type: Storage controller

Status: Available

Capacity: 17.993 TB

Free Capacity: 3.504 TB

Location: Rack 8283/12345 > Unit 35

Temperature States: Ambient Temperature: 39°C | Exhaust Temperature: 39°C

Events: Warning : 0 | Critical : 0 | [View details...](#)

Managed disks: 7 total

ID	Name	Allocation	State	Capacity	Type	Statistics
0	mdisk0	PRODDB (db2inst1)	Available	120 GB	Hard drive disk	show more
1	mdisk1	DEVDB (db2inst2)		120 GB	Hard drive disk	show more
2	mdisk2	DEV2DB (db2inst1)		120 GB	Hard drive disk	show more
3	mdisk3	DEPTDB		120 GB	Hard drive disk	show more

DB2 pureScale Instances View

IBM PureData System for Transactions | Workload Console | System Console | Default Admin | Help | Logout

Welcome | Database | Cloud | System

DB2 pureScale instances | db2inst1 | Start | Stop | Manage | Update | Maintain | Resume | Delete

DB2 pureScale instance name

db2inst1

Status: Running → Monitor → Log

Size: Small (2 CFs and 2 members on 2 compute nodes)

Maximum number of database: 10

Configuration:

Type	Host name	Status	IP address
CF	192	Running → Log	192.168.74.140
CF	192	Running → Log	192.168.74.141
MEMBER	192	Running → Log	192.168.74.140
MEMBER	192	Running → Log	192.168.74.141

Deployed databases

Database	Deployed by	Status	Actions
tracy2	admin	Error → Log → Monitor	Add storage
tracy1	admin	Error → Log → Monitor	Add storage
tracy3	admin	Error → Log → Monitor	Add storage

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Creating a Database Cluster Instance

IBM PureData System for Transactions | Workload Console | System Console | Default Admin | Help | Logout

Welcome | Database | Cloud | System

DB2 pureScale instances | db2inst1 | Start | Stop | Manage | Update | Maintain | Resume | Delete

DB2 pureScale instance

Specify options for your new DB2 pureScale instance

* DB2 pureScale instance name:

Description:

Size

Small (2 compute nodes)

Medium (4 compute nodes)

Large (6 compute nodes)

Database compatibility mode:

Database version:

Database level:

Advanced options

* Port number:

* Maximum number of databases:

Type	Host name	Status	IP address
CF	192	Running Log	192.168.74.140
CF	192	Running Log	192.168.74.141

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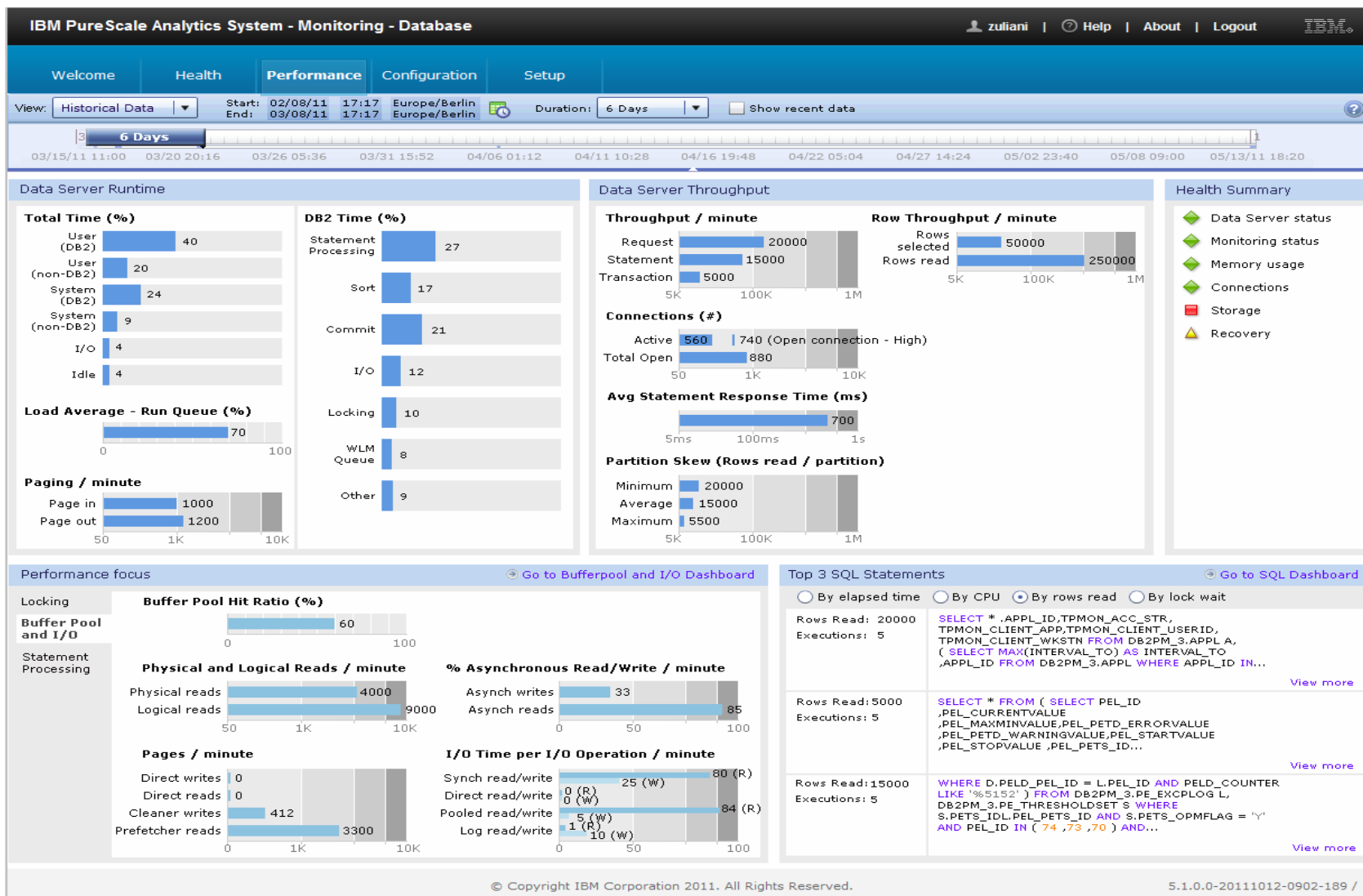
Creating a Database with OLTP Workload Pattern

The screenshot shows the IBM PureData System for Transactions console. A modal dialog box titled "Specify options for your database" is open, allowing configuration of a new database. The dialog includes the following fields and options:

- Database version: DB2 Version 10.1 for Linux
- Database level: DB2 Version 10.1 Fix Pack 1 for L
- Database size (GB): 120
- Database compatibility mode: DB2 (Default)
- Schema file: [Empty field] with a "Browse" button
- DB2 pureScale instance: A table with columns for Instance name, Description, Compatibility mode, Database version and level, and Size. Below the table, it states "There are currently no DB2 pureScale instances."
- Advanced options:
 - Page size: 4
 - Territory: US
 - Code set: UTF-8
 - Collating sequence: SYSTEM

Buttons for "OK" and "Cancel" are located at the bottom right of the dialog. The background console shows a list of databases (tracy1, tracy2, tracy3) and a "Databases" section with search and management options.

Database performance management



Database operations

Database Service Console

Maintenance mode

cbadmin | Help | mydb2

Monitoring - **Operation** - Logging

Operations

- AGENT AGENT
- database-db2.DB2 DB2
- MONITORING MONITORING
- SSH SSH

Fundamental

- + Update configuration
- + Automatic scheduled database backup
- + Create a database image
- Increase database storage

Storage usage and capacity

Component	Allocated space	Disk usage	Actions
Table spaces	120GB	30% used	+ Add storage
Logs	120GB	90% used	+ Add storage
Mirrored Logs	120GB	90% used	

Database Service Console

Maintenance mode

cbadmin | Help | mydb2

Monitoring - **Operation** - Logging

Operations

- AGENT AGENT
- database-db2.DB2 DB2
- MONITORING MONITORING
- SSH SSH

Fundamental

- + Update configuration

Add more storage - Logs & Mirrored logs

Increase storage to:

Logs: 108 GB used
612 GB free

Mirrored Logs: 108 GB used
612 GB free

OK Cancel

Actions

- + Add storage
- + Add storage

Operation Execution Results

Simplified Maintenance with Pre-Integrated Fixes

Reduce risk and eliminate manual errors when applying maintenance

- All hardware firmware and OS software patches integrated and tested together
- Designed to allow hardware and OS maintenance with zero downtime
- Single entry point for support
 - Integrated stack support

The screenshot displays the IBM PureData System System Console interface. The main navigation bar includes 'Welcome', 'Analytics', 'Hardware', 'Reports', and 'System'. The 'System' tab is active, showing 'System Maintenance - Fix Packs' for version 1.0.1.0. The current version is 1.0.0.0 with 150.3 GB of free space. A table lists available fix packs: 1.0.0.0 (N/A), 1.0.1.0 (132.0 GB), and 1.2.0.0 (245.5 GB). The 1.0.1.0 pack is selected, showing its current status as 'Installing: Stage 1 of 2 > Step 7 of 8'. It has a total size of 132.0 GB, a unique size of 65.4 GB, and an estimated installation time of 2 to 6 hours. A history entry shows an error on stage 2 of 5. Below, a table lists 35 included fixes with their names, descriptions, estimated times, component names, and statuses.

Name	Description	Estimated time	Component name	Status
fix_ps3117		1 minute	IBM PureScale Management Platform	
fix_ps2_691		3 minutes	IBM Flex System Manager	
fix_ps2_681		3 minutes	IBM Flex System Chassis Management Module	
fix_ps2_390		1 minute	IBM Flex System p460 Compute Node	
fix_ps2_108		5 minutes	IBM Flex System EN4093 10Gb Virtual Fabric Scalable Switch	
fix_ps162_9		10 minutes	IBM Flex System FC5022 16Gb SAN Scalable Switch	

PureData for Transactions will provide YOU

Reducing complexity

The entire system lifecycle is simplified from acquisition to retirement

IT

Accelerating time to value

Management expertise is built in each system and ready for immediate use

Business

Improving IT economics

Each system tuned for the different needs of different workloads

Financial

Thank You!

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