

Lower the Cost of Data with IBM Power Systems and DB2 Software

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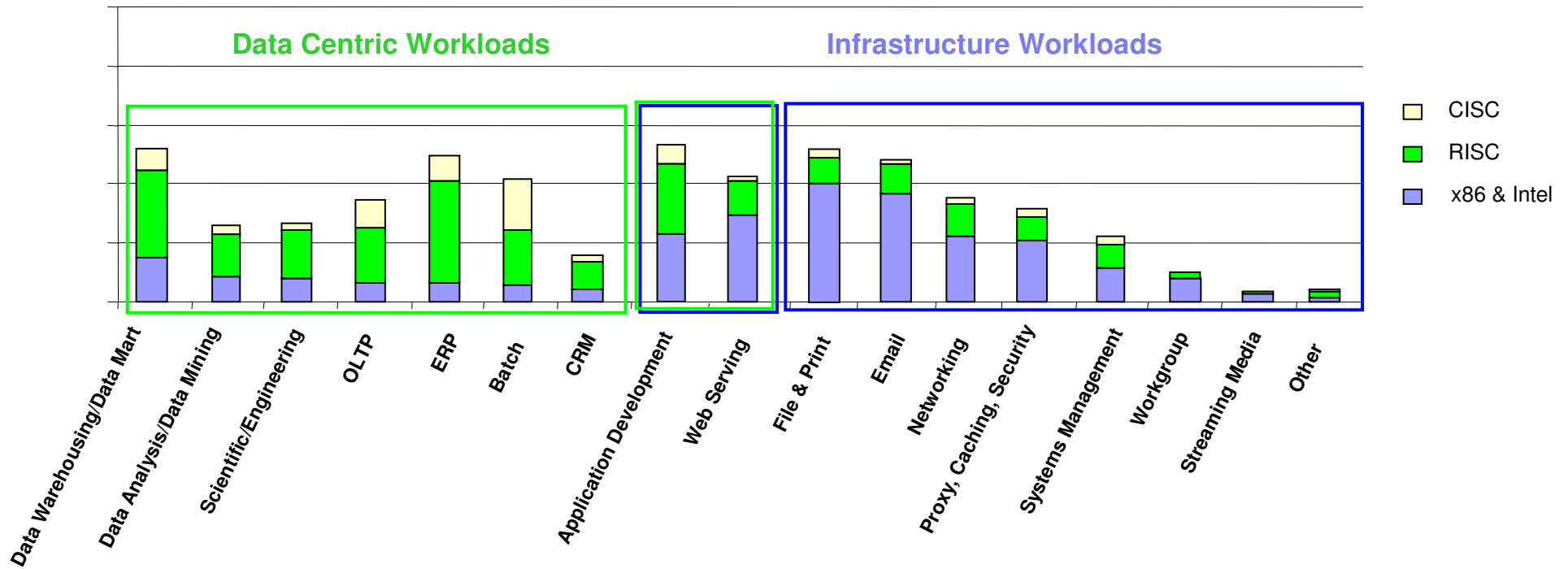
Product Manager IBM Power Systems

RISC,x86 and Mainframe Workload Spend and Deployment.



Data Centric Workloads are traditional on RISC architecture because of performance, availability and lower DB License-cost compared to Intel

Worldwide server market by workload by CPU Type - IDC



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Power Systems Value



Virtualization without Limits

- ✓ Drive over 90% utilization
- ✓ Dynamically scale per demand



Dynamic Energy Optimization

- ✓ 70-90% energy cost reduction
- ✓ EnergyScale™ technologies

Workload-Optimizing Computing



AIX - The Future of UNIX

Total Integration with i

Scalable Linux ready for x86 Consolidation



Resiliency without Downtime

- ✓ Roadmap to Continuous Availability
- ✓ High availability systems & scaling



Management with Automation

- ✓ VMControl to manage virtualization
- ✓ Automation to reduce task time

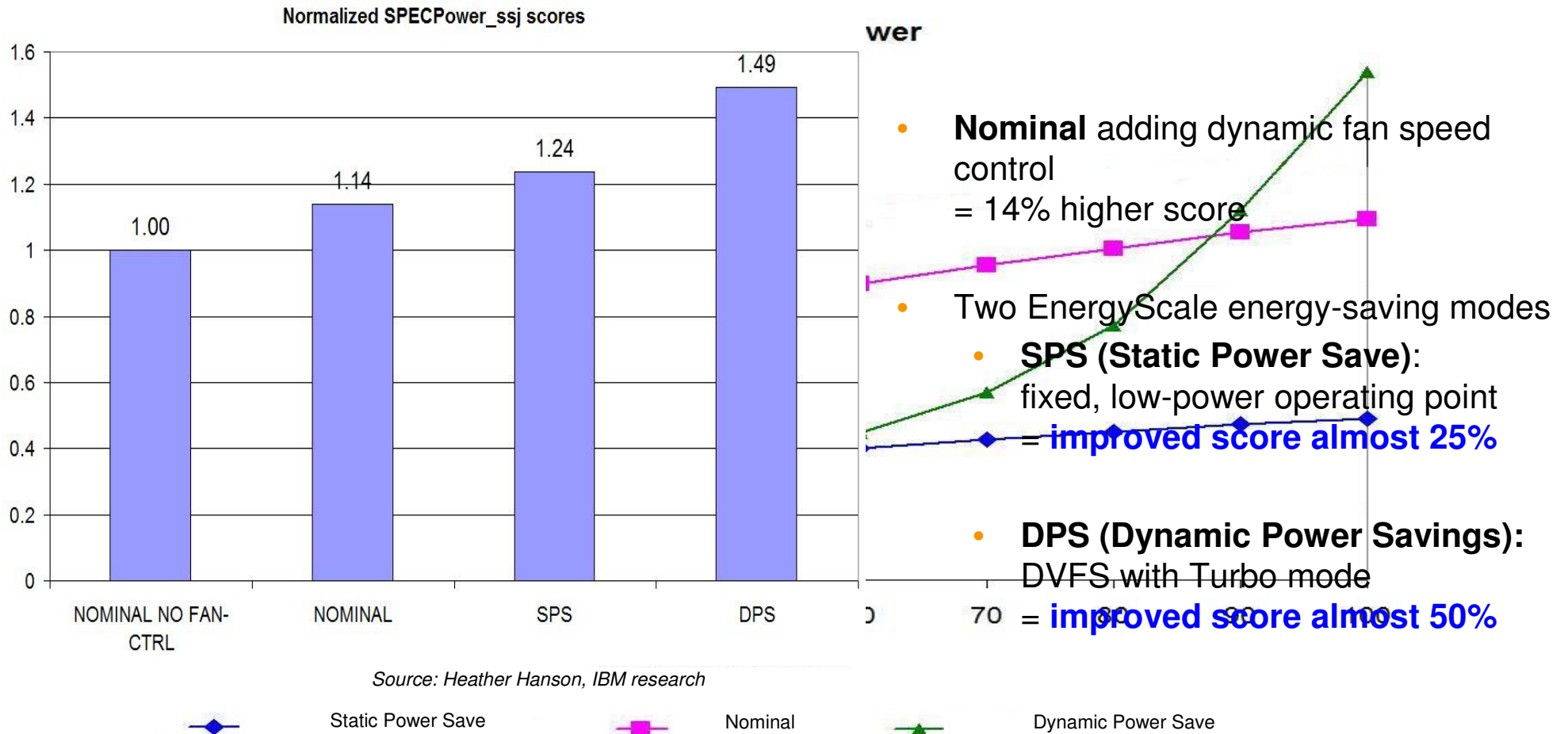


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EnergyScale Impact with POWER7



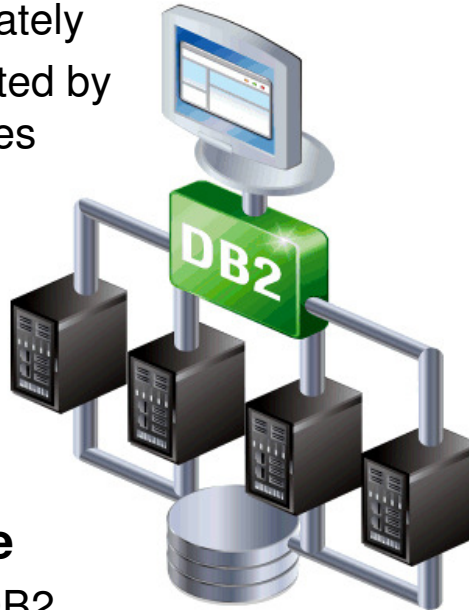
- SPECpower_ssj2008 runs on a **IBM Power 750 Express** system**



* Results shown on our prototype system, should not be construed as committed capability for a shipping IBM Server.
 * SPEC and the benchmark name SPECpower_ssj are trademarks of the Standard Performance Evaluation Corporation

Virtualization without Limits

- ✓ Dynamic memory and processor changes exploited by DB2 immediately
- ✓ Large numbers of threads exploited by DB2 extreme parallelism capabilities



Dynamic Energy Optimization

- ✓ DB2 storage compression further reduces energy requirements
- ✓ Scan sharing reduces I/O bandwidth further reducing energy requirements

Resiliency without Downtime

- ✓ PowerHA a key component of DB2 pureScale
- ✓ AIX HA capabilities exploited by DB2 (storage keys, cluster manager, heartbeat, etc.)

Management with Automation

- ✓ DB2 workload management and Self Tuning Memory Manager to exploit consolidation and virtualization
- ✓ IBM Smart Analytics System lifecycle management



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Power Systems and DB2 – Tight Integration



- **Performance of POWER7 and DB2**
 - More cores and threads – 32 chips, 8 cores/chip, 4 threads/core
 - Exploited by DB2 better than any other DBMS
 - Full SSD support in Power system units
 - DB2 can use SSD for both permanent objects (tables/indexes) as well as temporary objects
- **Consolidation of DB2 on POWER7**
 - PowerVM virtualization second to none
 - Active Memory Sharing exploited by DB2 self tuning memory manager
 - When peak demand hits, DB2 can immediately leverage additional resources
 - Workload management integrated between AIX and DB2
 - DB2 able to meet customers SLAs more easily
- **Reliability of Power Systems and DB2**
 - Power 3x – 4x more reliable than Linux on x86*
 - 99.997% availability with Power and AIX
 - DB2 tightly integrated with PowerHA and other HA features of AIX



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Source: ITIC 2009 Global Server Hardware & Server OS Reliability Survey

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What Customers say about DB2 on Power....



“By choosing to implement DB2 compression right away, **we have reduced the database size by around 40 per cent.** This gives us faster backup and reduced storage costs, and makes the SAP technical upgrades easier and quicker. And...Better performance , manufacturing runs are over 65 percent faster”

- *Andrew Juarez, Coca-Cola Bottling Company Consolidated*



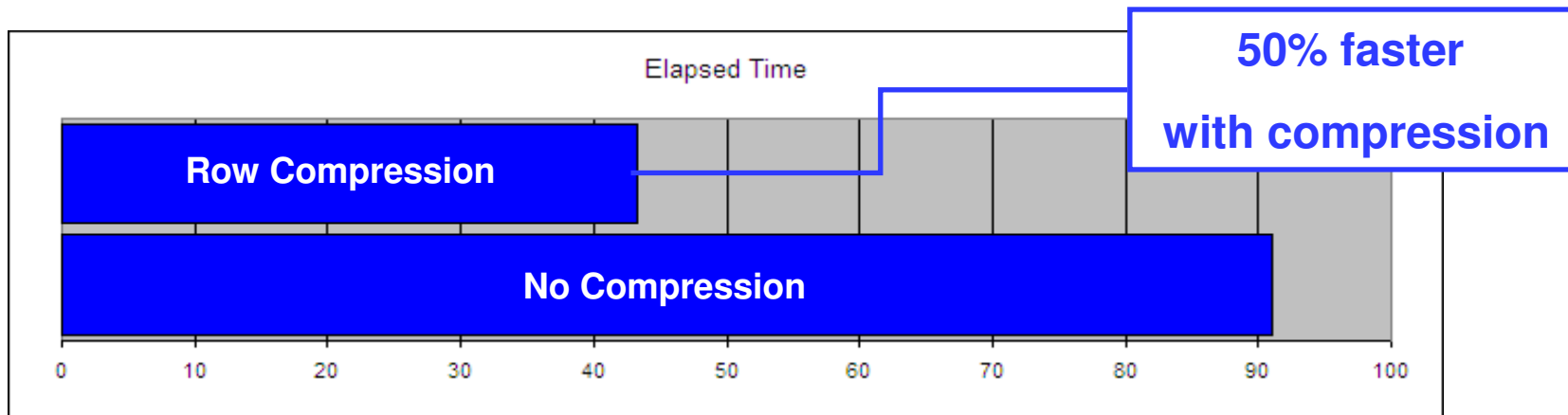
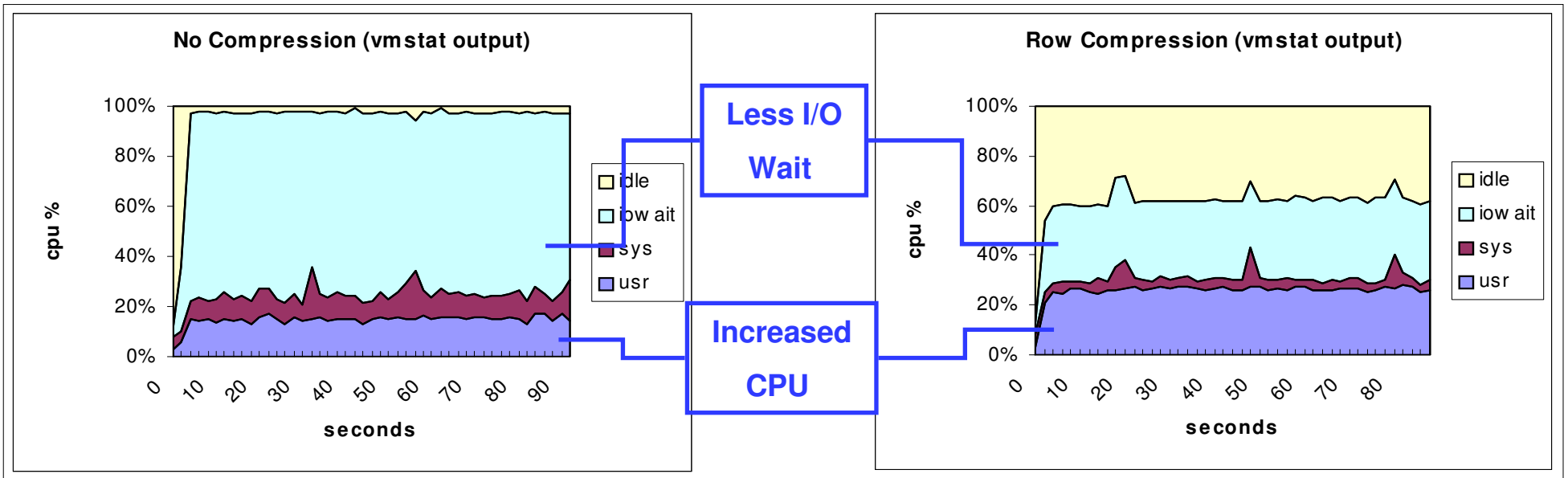
“In comparison tests with both Oracle Database and Microsoft SQL Server, **IBM DB2 continually demonstrated a better price-to-performance ratio.**”

- *Benjamin Simmen, Zurich Financial Services*



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Performance Benefits of Compression



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DB2 High Availability on IBM Power



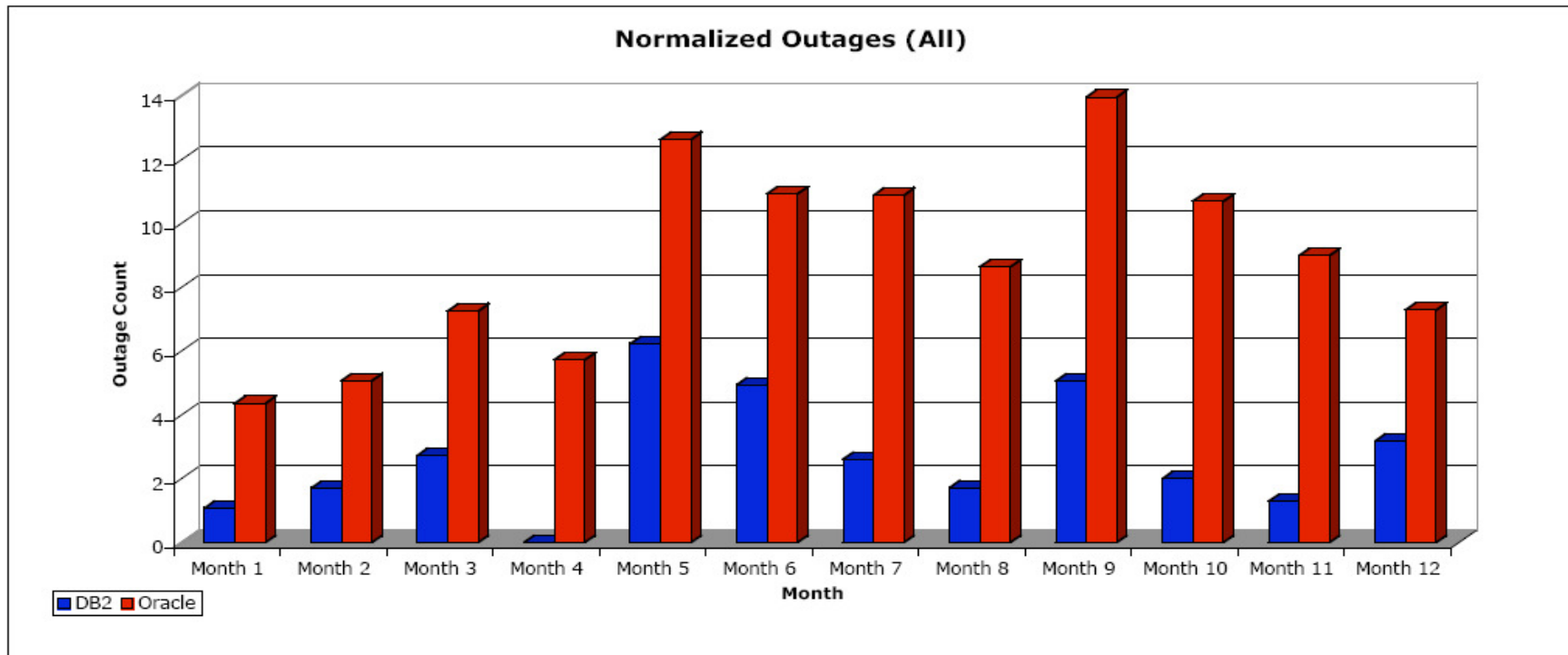
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Independent Analysis of Real Customers Proves It



“After extensive review of more than 2,354,000 data points covering over 4,100 closely watched production comparisons, the advantage of running DB2 on IBM Power Systems is strongly supported. The advantages of the synergy between DBMS and platform translate into hard cost savings for each customer, and substantially affect the bottom line cost of ownership.”

-- Solitaire Interglobal Ltd



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Solitaire Interglobal Ltd Whitepaper: DB2 Performance on IBM Power Systems

What Customers are Saying about High Availability



*“One of the reasons that we **chose DB2 was the built-in HADR** database replication, which gives us high availability with **no additional cost or complexity.**” – Ron Lim, Operations Manager at Jebsen & Jessen SEA,*



*“**HADR enables us to offer zero downtime for maintenance** and gives us the ability to deal with small problems and local outages automatically.” - Jochen Guther, General Manager of IT, Teleflex*



*“In addition to price, we chose DB2 over Oracle because the high availability and disaster recovery capability of DB2 is supported for SAP solutions whereas the Oracle RAC high availability functionality is not. One of the major advantages of DB2 is that we get a disaster recovery solution for our SAP system with **HADR at no extra cost.**” - Gustav Elias, Austrian Railways*

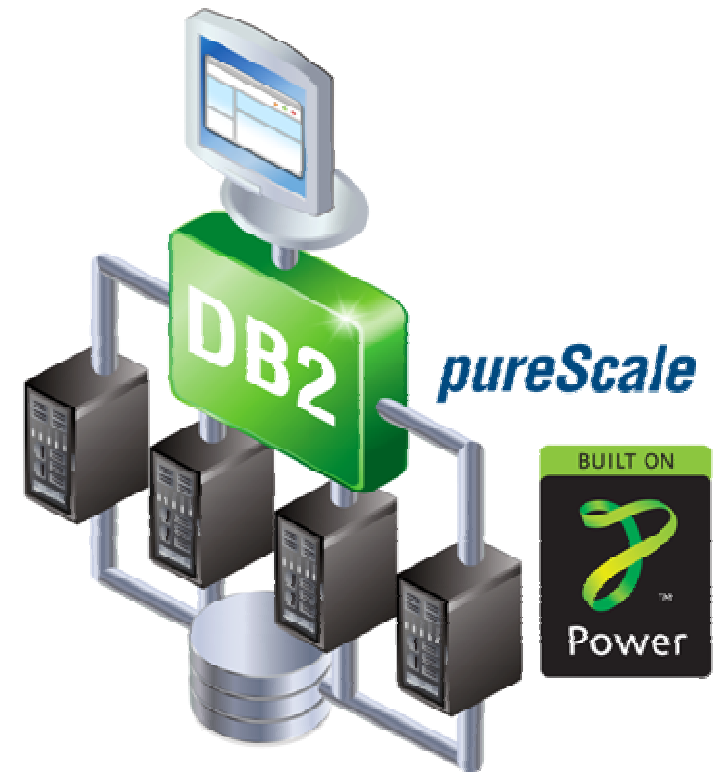


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DB2 pureScale



- **Unlimited Capacity**
 - Buy only what you need, add capacity as your needs grow
- **Application Transparency**
 - Avoid the risk and cost of application changes
- **Continuous Availability**
 - Deliver uninterrupted access to your data with consistent performance



DB2 pureScale can help you reduce the risk and cost of meeting changing business demands

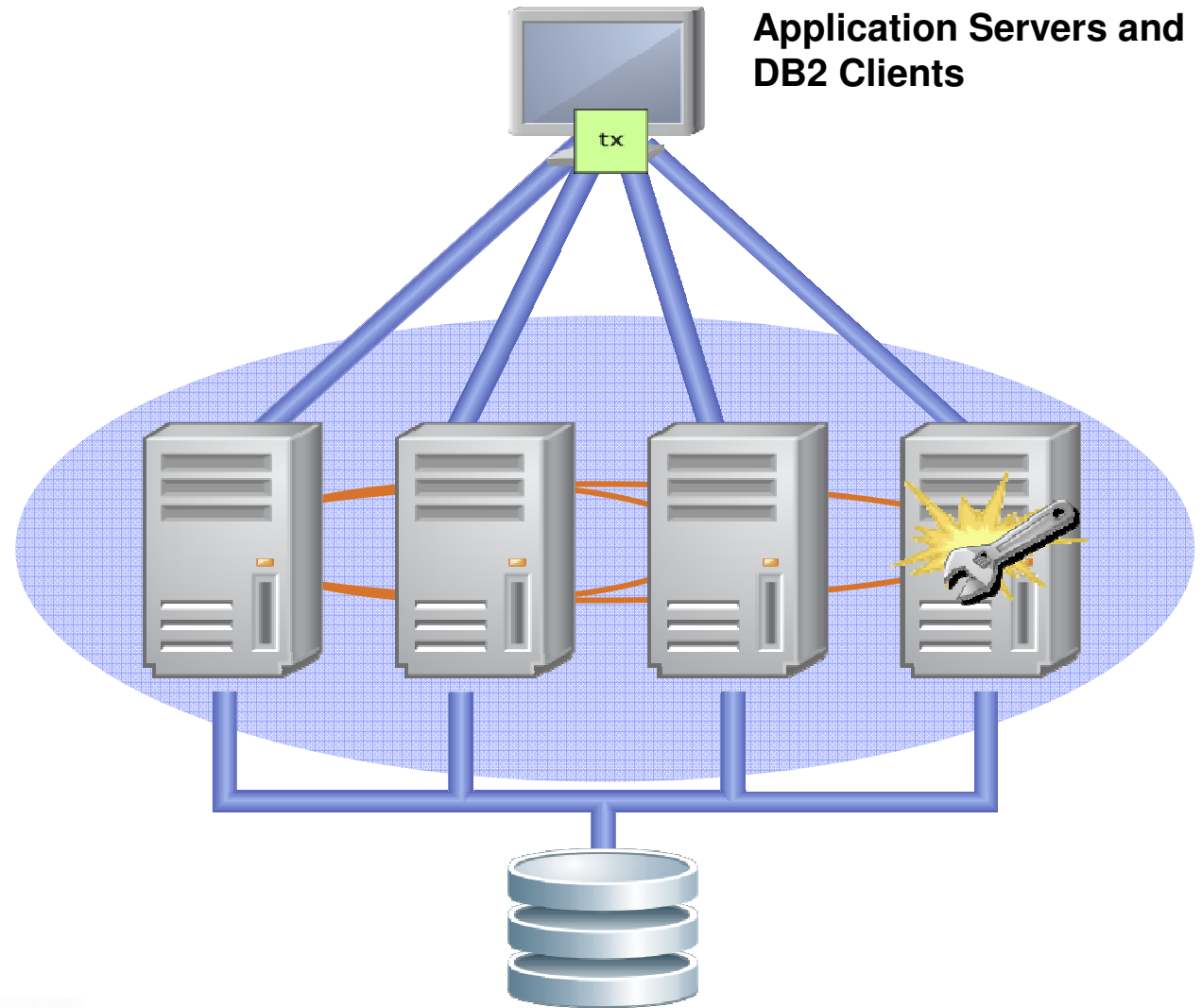


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Recover Instantaneously From Node Failure



- Protect from infrastructure related outages
 - Redistribute workload to surviving nodes immediately
 - Completely redundant architecture
 - Recover in-flight transactions on failing node in as little as 15 seconds including detection of the problem



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Lowering Total Cost of Ownership



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Ease of Manageability



- Automated memory discovery and DB2 configuration
- Automated storage topology discovery and DB2 setup
- Support for AIX “On Demand” dynamic reconfiguration
- Integrated workload management with AIX WLM
- Self Tuning Memory Manager (STMM) monitors both the database and AIX memory consumption
- Enabled and optimized for IBM virtualization (Dynamic in all aspects!)



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What Customers Say About DB2 OLTP Performance



“The performance of the new IBM Power Systems servers combined with DB2 is clearly significantly greater. **For larger tables above 1GB, the data compression functionality within DB2 is delivering up to 70 per cent capacity reductions. At our data growth rates, the compression performance offers a considerable current and future saving.**” - Jürgen Fischer



“We measured and compared database solutions, and DB2 was better than other enterprise-class systems **we considered, not only in terms of performance metrics, but also concerning handling and management of backups and costs. Database systems differ substantially from each other when it comes to maintenance, and** we found that DB2 offers significant cost savings **here.** With PowerHA clustering, **and the data mirrored to the remote DS4000 systems,** we expect SAP application availability to become near-continuous” - Stefan Förster.



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Summary



- DB2 Performance on IBM Power
 - Higher Performance = Lower Costs (less licenses)
- DB2 High Availability with IBM Power
 - More Reliable and no reduction of service in case of failover
- DB2 and IBM Power Lowers Total Cost of Ownership
- Dynamic Systems Deliver More Value
- DB2 on POWER7 delivers even more integration and more value to customers



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More info on:

<http://www-01.ibm.com/software/data/db2/power-systems/>

or Google: IBM POWER7 DB2



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Power Systems Value Enhanced by DB2



Virtualization without Limits

- ✓ Drive over 90% utilization
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Dynamic memory and processor changes exploited by DB2 immediately

Large numbers of threads exploited by DB2 extreme parallelism capabilities

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(storage keys, cluster manager, heartbeat, etc.)



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Dynamic Energy Optimization

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DB2 storage compression further reduces energy requirements

Scan sharing reduces I/O bandwidth further reducing energy requirements

DB2 workload management and STMM to exploit consolidation and virtualization

ISAS lifecycle management



Management with Automation

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Power Systems and DB2 – Easy to Move To



- **Higher productivity = lower TCO**
 - “We have shifted our resources from 70% on maintaining old systems to 70% deploying new solutions” – customer switched from Sun to IBM
 - “We have been pretty pleased with the performance, compression savings and things like the self-tuning memory with DB2, but now the DBAs doing the work have a lot more time to focus on SAP issues rather than Oracle issues.” - Andrew Juarez, Coca-Cola Bottling Co moved from Oracle to DB2
- **Moving to Power and DB2 from Sun and Oracle is easy**
 - “Moving form Solaris to AIX was a non event” - Transplace
 - “With IBM DB2 9.7 and the new IBM Optim Development Studio, we completed our recent data migration project from Oracle to DB2 in 80 percent less time than we originally estimated, saving about two and a half months.” - Gene Ostrovsky, VP Research and Development, ExactCost



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IBM Data Warehouse Advantages



- **Suitability for Modern Workloads**
 - Ideal for analytic BI and for Real Time data warehouse
 - High transaction rates, fast response times, low cost per query
 - Structured and unstructured information.
- **All the Data Warehousing features you need**
 - Full set of rich DW features built in
 - Including Data mining, Data modeling, OLAP support, Cubing Services, Performance Management, Workload Management, Data Flow, all in one pre-configured and pretested hardware and software package
- **Less administration effort**
 - Automation and pre-configuration eliminate administration tasks
 - Concentrate resource on business value
- **Low Cost / TCO**
 - Performance, efficiency, economies of scale, and applied R&D combine to provide low cost and low TCO, thus higher ROI
 - Pricing is predictable, no unexpected price hikes



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What Customers say about DB2/POWER for SAP



“Norkis Group selected the IBM DB2 database, based on its advanced integration with SAP applications. DB2 offers excellent performance alongside enterprise-strength backup and recovery solutions. It is able to handle the very large data sets that we expect to generate, and gives us room to grow as the business itself expands. What tipped us towards the IBM solution was the superior virtualization functionality offered by the Power Systems platform” - Ronald Alfeche



Steelmaker Borçelik has been using SAP ERP applications, initially with an Oracle database platform. Licensing and support costs were rising, and Borçelik looked for a more efficient solution to help optimize business processes. “With DB2 on the IBM Power Systems platform, we get great performance and reliability at a low cost of operation – as well as the potential to leverage the latest advances in database technology.” - Ozcan Soke



“The integration of DB2 and SAP applications is excellent, particularly the functionality of the SAP transaction ST04 - system monitor. In our context, for SAP application operations, IBM DB2 offers massively improved functionalities when compared to Oracle, and helps to reduce database administrative workload by around 30 per cent.” - Iwan Nussbaumer, Industrielle Werke Basel



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What Customers are Saying About DB2



*"IBM DB2 provides **excellent reliability, security and scalability**, and ensures that Britannia is fully able to increase its business operations at low total costs of operation."*

- T S Purushothaman, corporate head of IT systems for Britannia.

*Britannia expects a **30% decrease in database administration costs***



*"We use DB2 as the database of choice for our SAP NetWeaver BI solution because it offers **simple administration and lower licensing costs**. System performance in parallel mode has increased, and **the fully integrated database cockpit helps to reduce operator workload.**"*

- Matthias Assmann, Head of Management Information



*"IBM and SAP have formed a close alliance and IBM DB2 has transformed into becoming a leading database platform for SAP applications, **with high functionality, easy management and low operational costs. We soon began to see the advantages of migrating to the IBM platform.**"*

- Ozcan Soke, IT Manager



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IBM Data Warehouse Advantages on Power



- **Faster Time to Value**
 - Fast to deploy, less effort to maintain, tooling to speed development
 - Delivers business benefits faster
- **Proven**
 - Based on many years of experience, 100's of implementations
 - Deploy with complete confidence
 - IBM is on 4th generation Warehouse technology
 - Oracle have only just started down this path with HP, then after a few months switched to Sun, theirs is a much less mature and proven technology
- **Performance and Scalability**
 - Full and mature implementation of massively parallel processing (MPP) for very high performance and unlimited scalability.
 - Throwing more hardware at Oracle RAC helps the Oracle solution but is not efficient and simply adds unnecessary cost



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DB2 Architecture Maps to POWER7 Capabilities



- POWER7 – massive number of threads per server
 - Requires sophisticated software to **exploit**
 - DB2 threaded engine built to scale on large multi core servers
 - Requires sophisticated **virtualization** to consolidate
 - DB2 autonomics “play nice” and “react quickly” in virtualized, dynamic environments
 - Requires advanced **workload management** to meet SLAs
 - DB2 and AIX tightly integrated WLM to deliver the resources where they are needed most
 - Requires **advanced diagnostics** to help lower administration costs for customers with massive levels of concurrency
 - The blue stack helps resolve problems faster with integrated diagnostics
 - Requires integrated **high availability**
 - If any part of the solution fails, DB2 and PowerHA respond more rapidly to provide business continuity



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Technology Driving Performance Advances

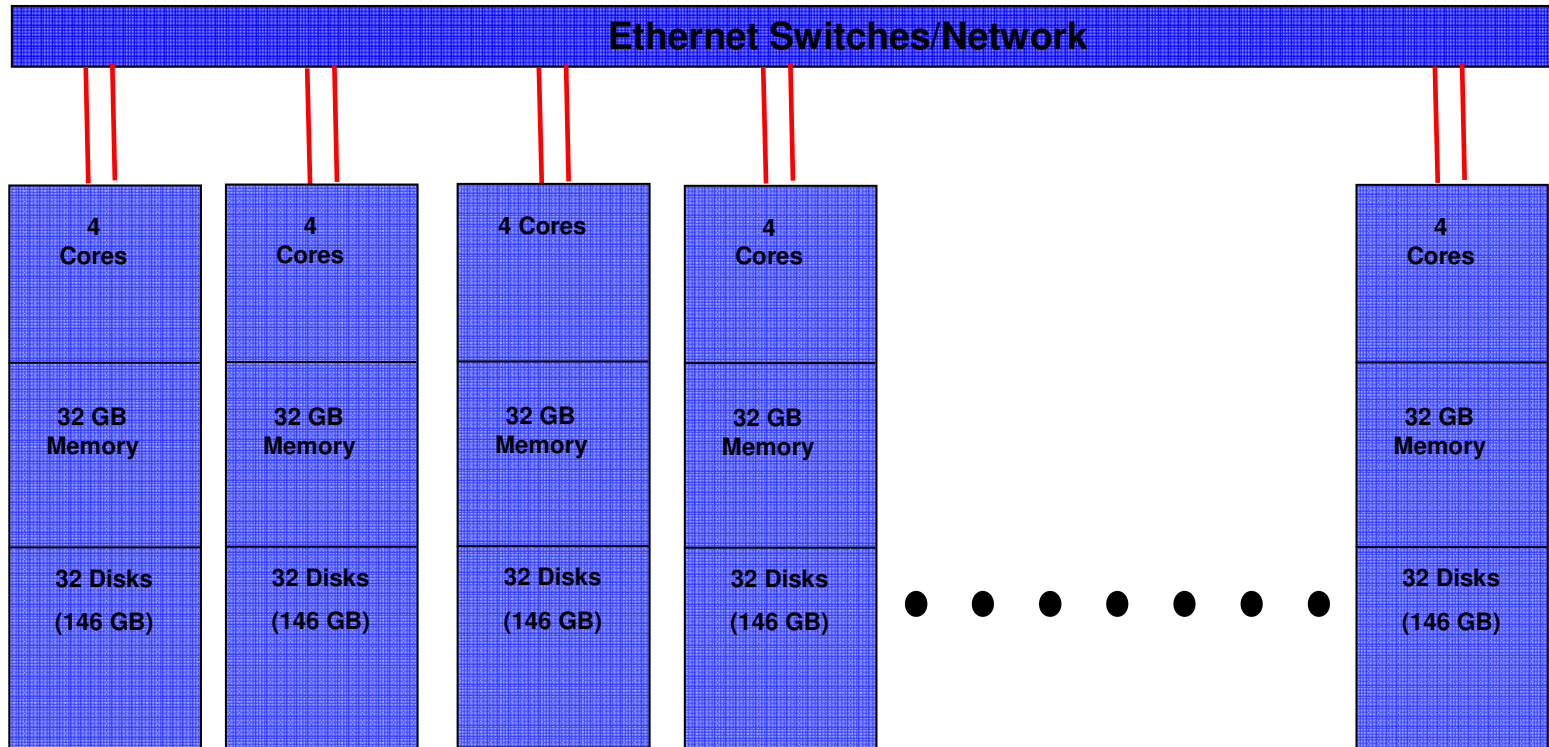


- Process Exploitation
 - Deep exploitation of Simultaneous Multi Threading (SMT)
 - Fully threaded DB2 engine
 - NUMAtization of DB2 resources to align with system architecture
- Memory Exploitation
 - Autonomic exploitation of POWER features such as larger page sizes
 - Support for AIX multi page support that includes 64KB, 16MB and 16GB AIX page sizes
 - Co-operative Caching
- Storage Exploitation
 - Exploits Asynchronous I/O and Scatter / Gather I/O, as well as AIX CIO and DIO interfaces
 - End-to-End I/O Priorities
 - Atomic Logical Volumes
- Enablement for POWER6 features (Decimal Floating Point, Storage Keys)
- Deep integration with AIX APIs
- Exploits xIC capabilities for optimal performance using Profile Directed Feedback
- And many, many more ...



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Sample Smart Analytics IBM Configuration



Scalable Data Modules

Simpler architecture

Gigabit Ethernet

No extra Storage Servers

**per Data Module
>= 1.2 Sustained
GB/sec I/O
Bandwidth**

Smaller Building blocks

- True shared nothing architecture since 1995
- Much simpler, single tier architecture
- No practical limit in scalability



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IBM Power - Staffing



Staff Discipline	DB2	Oracle
Account management	0.1	0.1
Application management	0.9	1.4
Backup and archiving	0.1	0.7
Business recovery services	0.2	0.3
Database management and administration	1.5	4.3
Disk and file management	0.9	1.2
HW and network configuration / re-configuration	0.3	0.3
HW deployment	0.3	0.3
Operations	4.7	7.2
OS support	0.3	0.3
Planning and process management	0.7	1.0
Performance tuning	0.7	2.1
Repository management	0.2	0.2
Security and virus protection	0.1	0.1
Service desk	3.2	5.7
Software deployment	0.3	0.5
Storage capacity planning	0.3	0.7
Systems research, planning and product management	0.1	0.1
Traffic management & planning	0.9	0.9
User administration	0.2	0.5
Total staffing level	16.0	27.9



more effectiveness

Solitaire Interglobal Ltd Whitepaper: DB2 Performance on IBM System p® and System x®

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