DB2 9 (formerly viper) for z/OS
and System z

DB2 Information Management Software

Topics

- ## DB2 9 for z/OS
  - ### Business Insight
  - ### Cost Savings thru Optimization
  - ### Business Resiliency

- ## zIIP and System z

- ## DB2 tools

- ## DB2 9 summary

DB2 9 for z/OS Innovation: Insight

✓ **Business Insight**

  ✓Hybrid data server: XML and relational

  ✓Enhanced SQL

  ✓Business Partner improvements

  ✓QMF cross-platform work station & web

✓ **Cost Savings through Optimization**

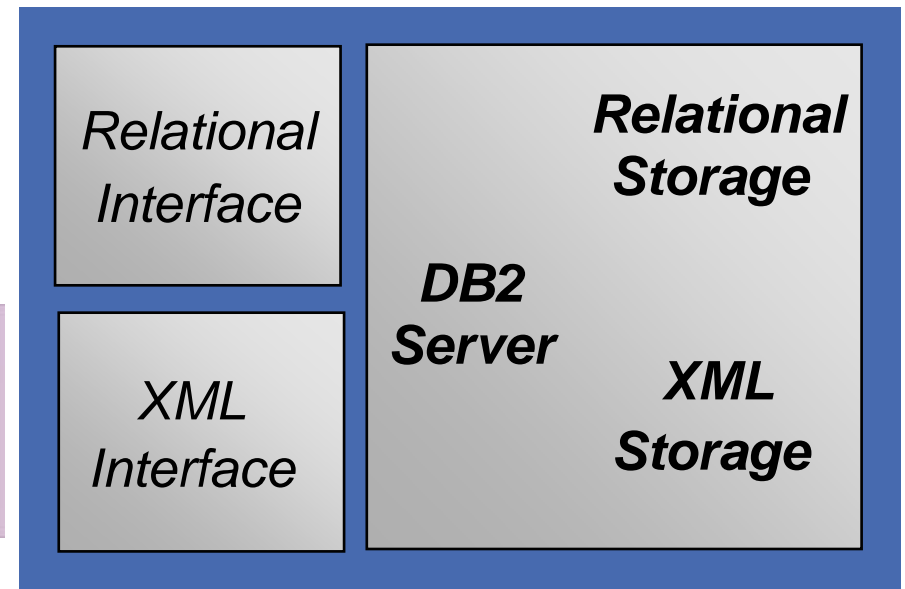✓ **Business Resiliency**

Capabilities Inside the Engine

Performance, Performance, Performance

SERVER

CLIENT

SQL(X)

Data Management Client

Customer Client Application

SOA

Relational Interface

XML Interface

DB2 Server

Relational Storage

XML Storage

Native storage Schema Index Functions Utilities

SQL: Productivity, DB2 family & porting

- **XML**
- **MERGE & TRUNCATE**
- **SELECT FROM UPDATE, DELETE, MERGE**
- **INSTEAD OF TRIGGER**
- **BIGINT, VARBINARY, BINARY, DECIMAL FLOAT**
- **Native SQL Procedure Language**
- **Nested compound**
- **Optimistic locking**

- **LOB File reference variable & FETCH CONTINUE**
- **FETCH FIRST & ORDER BY in subselect and fullselect**
- **INTERSECT & EXCEPT**
- **ROLE & trusted context**
- **Many new built-in functions, caseless comparisons**
- **Index on expression**
- **Improved DDL consistency**
- **CURRENT SCHEMA**

Business Partners: Many enhancements

- SHRLEVEL(REFERENCE) for REORG of LOB table spaces
- Online RENAME COLUMN
- Online RENAME INDEX
- Online CHECK DATA and CHECK LOB
- Faster REORG by intra-REORG parallelism
- More online REORG by eliminating BUILD2 phase
- LOB Lock reduction
- Skipping locked rows option
- Online REBUILD INDEX
- Change SCHEMA & VCAT
- Tape support for BACKUP and RESTORE SYSTEM utilities
- Recovery of individual tablespaces and indexes from volume-level backups
- Enhanced STOGROUP definition
- Utility TEMPLATE switching
- Conditional restart: automatic search for appropriate checkpoint
- CLONE Table: fast replacement of one table with another
- Buffer management by WLM

- Global query optimization
- Generalizing sparse index and in-memory data caching method
- Optimization Service Center
- Autonomic reoptimization
- Logging enhancements
- LOBs Network Flow Optimization
- Faster operations for variable-length rows
- NOT LOGGED table spaces
- Index on expressions
- Universal Table spaces
- Partition-by-growth table spaces
- APPEND option at insert
- Autonomic index page split
- Index page sizes 8K, 16K, 32K
- Support for optimistic locking
- Faster and more automatic DB2 restart
- MODIFY RECOVERY enhancements
- RLF improvements for remote application servers such as SAP
- Preserving consistency when recovering individual objects to a prior point in time

- DECIMAL FLOAT, BIGINT
- VARBINARY, BINARY
- TRUNCATE TABLE statement
- MERGE statement
- FETCH CONTINUE
- ORDER BY and FETCH FIRST n ROWS in sub-select and full-select
- ORDER OF extension to ORDER BY
- Various scalar functions
- XML support in DB2 engine
- Native SQL Stored Procedures, able to use zIIP
- SELECT FROM UPDATE/DELETE/MERGE
- Enhanced CURRENT SCHEMA
- IPv6 support
- Unified Debugger
- Network Trusted Context
- Database ROLEs
- Automatic creation of database objects
- Modify early code without requiring an IPL
- Utilities CPU reduction
- Temporary space consolidation
- . . .

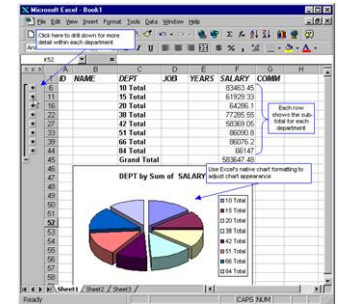**TCO Reduction**   **Continuous Availability**   **Performance**   **Scalability**   **SQL**   **Portability**

QMF

- Drag and drop querying, reporting and analytics

- Executive dashboards and data visualization

- Enhanced OLAP with DB2 Cube Views

- Reengineered cross-platform development environment

- New security model for access control & personalization

- Enabled for WebSphere Application Server

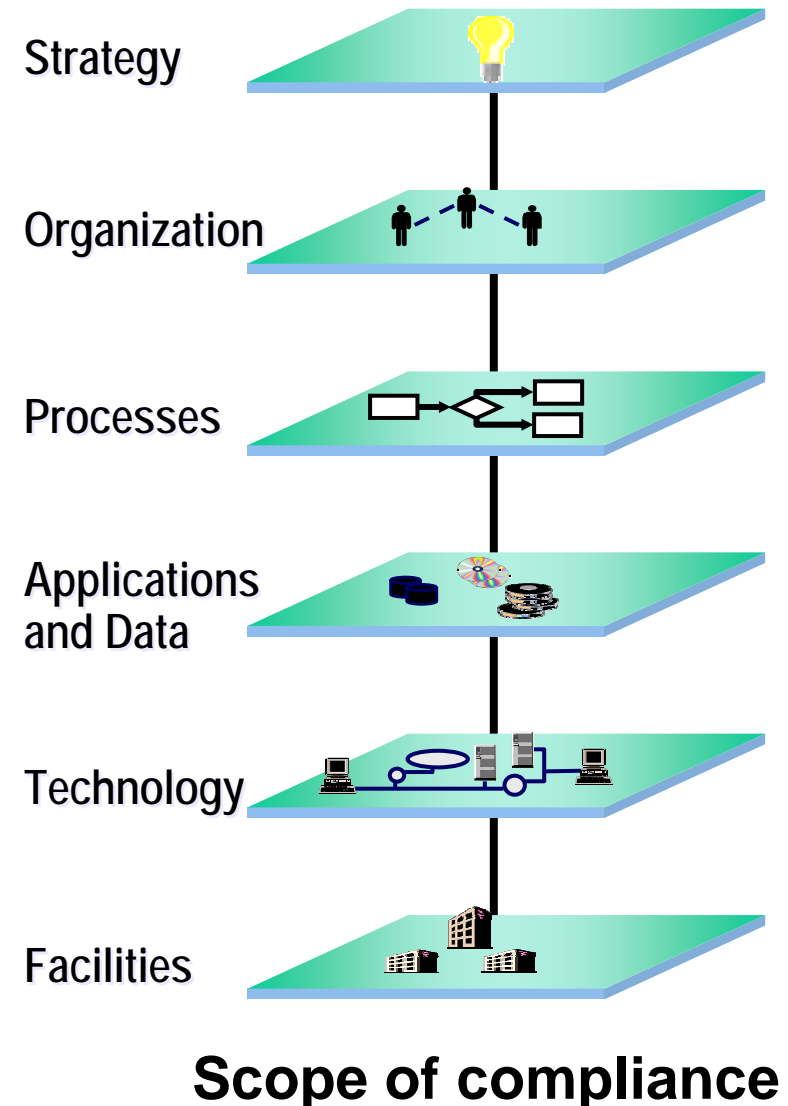# DB2 9 for z/OS Innovation: Cost

- **Business Insight**
- **Cost Savings through Optimization**
  - **Security and Regulatory Compliance**
  - **Performance improvements**
  - **Synergy with System z**
  - **Query enhancements**
- **Business Resiliency**

Regulatory Compliance Characteristics

- Mandatory: Agencies may require qualification and/or adherence to specific standards

- Non-directive: Usually do not specify exact steps needed to comply

- Non-certifiable: Agencies generally do not approve, recommend, or validate solutions

- Continuously changing: Regulations, their interpretation, and their codification into corporate policies change frequently

- Increasing IT impact: While few apply directly to IT, regulations increasingly affect IT systems

- Intrinsically related to risk: Agencies now recommend a risk-based management approach

Strategy

Organization

Processes

Applications and Data

Technology

Facilities

Scope of compliance

Regulatory Compliance in DB2 9 for z/OS

- Key implementations

- Roles

- Network Trusted Contexts

- Improved auditing

- Data Encryption

- Secure Socket Layer

DB2 9 for z/OS

Performance Improvements

- CPU reductions in LOAD and REORG

- LOB performance, function, scalability

- SQL and optimization improvements

- Use zIIP in remote native SQL Procedure Language

- Improved varying length performance

- Sequential disk access

Query Enhancements

- SQL enhancements: INTERSECT, EXCEPT, RANK, caseless comparisons, cultural sort, FETCH FIRST in fullselect …

- Index improvements: index on expression

- Improved Optimization statistics: Histogram

- Optimization techniques
  - Cross query block optimization
  - Generalize sparse index & in-memory data cache method
  - Dynamic Index ANDing for Star Schema

- Analysis: instrumentation & Optimization Support

DB2 9 for z/OS Innovation: Resiliency

- **Business Insight**

- **Cost Savings through Optimization**

- **Business Resiliency**

    - **Availability: Database on Demand**

    - **Scalability**

    - **Usability**
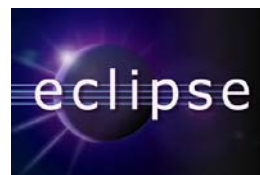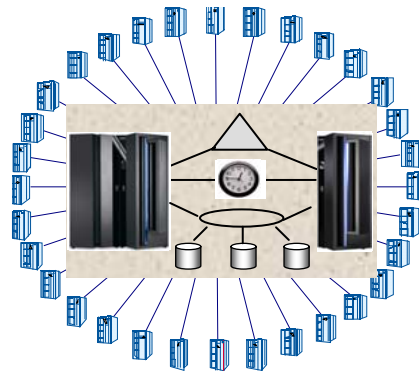
Online Schema Evolution →
Database Definition On Demand

- Online reorganization with no BUILD2 phase
- Fast replacement of one table with another
- Table space that can add partitions, for growth
- Improve ability to rebuild an index online
- Rename column and index
- Modify early code without requiring an IPL
- Alter table space and index logging
- Create & alter STOGROUP SMS constructs

Scalability

- **Insert performance APPEND INDEX LOG**
    INDEX on expression, 8K, 16K, 32K
    - Randomized index key
    - Log Latch contention & spin relief, archiving
    - Not logged table space
- **Partitioned table with segmented space**
- **Memory improvements 64 bit address space**

Usability

- **Application Programming**

- **Backup and restore objects, use tapes**

- **Optimization Service Center**

- **INDEX page split**

- **Buffer pool management by WLM**

SOA and Information on demand
What the market is telling us

Huge investment in traditional programs & data
  – "200 Billion lines of COBOL …"
  – "more than a trillion dollars' worth of legacy mainframe code."

The key to unlocking value:
  – Unstructured and structured
  – Easy to find & use, tailored, cost-effective & integrated

How do you unlock the value in your applications?

WebSphere
Rational the software development company

SOA

DB2

How do you unlock the value in your data?
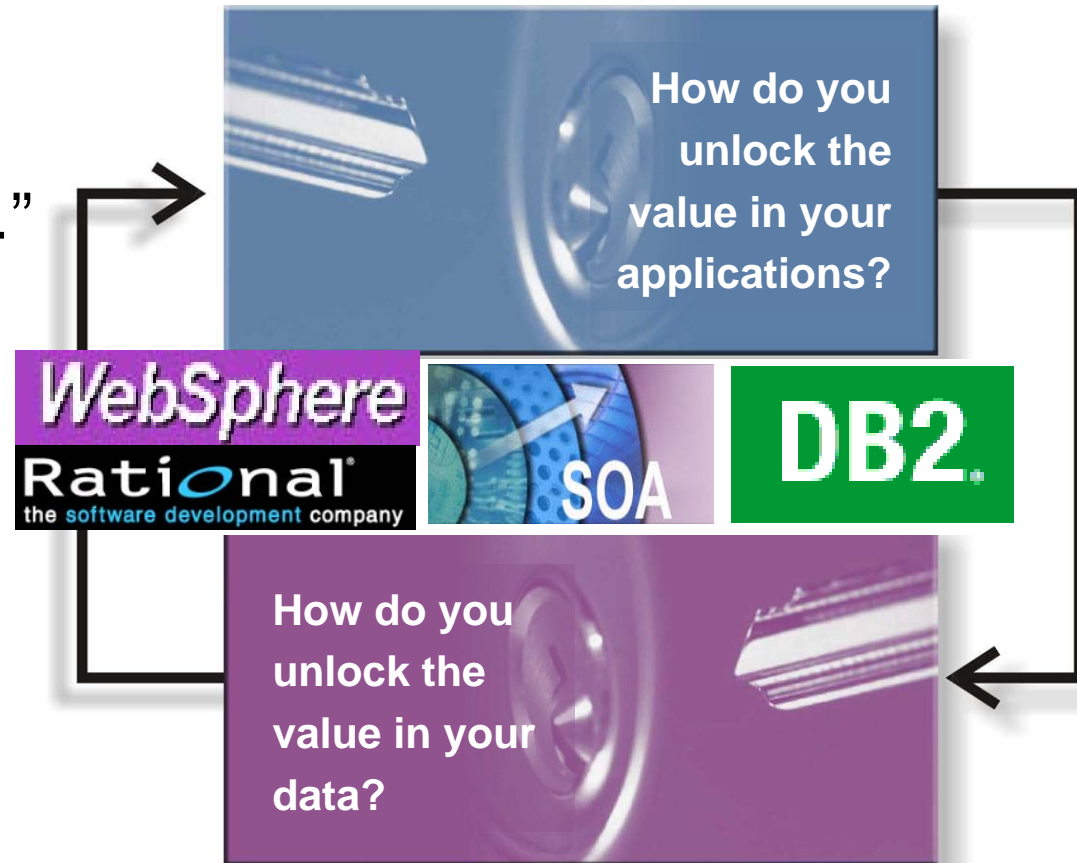
It's time to unlock the value of these assets

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System z Synergy & DB2 9

- System z9 Integrated Information Processor (zIIP) Enterprise Class & Business Class
- Enhanced Cryptography
- Channels (4 Gb & MIDAW)
- Faster Processors
- Up to 54 Processors EC
- More memory, better value; 64 bit virtual storage
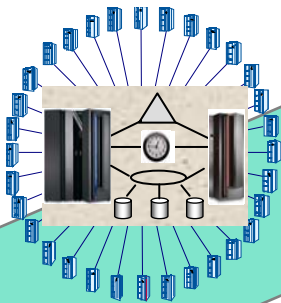- z/Architecture new instructions
- Parallel Sysplex
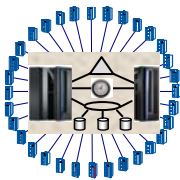
- IPv6
- SSL
- Java
- Decimal float
- Backup & restore
- Security
- Unicode collation
- Compression
- System z Application Assist Processor (zAAP)
- WLM enhanced …

Technology Evolution with Mainframe Specialty Engines

Building on a strong track record of technology innovation with specialty engines, IBM intends to introduce the System z9 Integrated Information Processor

IBM System z9 Integrated Information Processor (IBM zIIP) 2006

Centralized data sharing across mainframes

System z9 Application Assist Processor (zAAP) 2004

Designed to help improve resource optimization for eligible data workloads within the enterprise

Integrated Facility for Linux® (IFL) 2001

Incorporation of Java™ into existing mainframe solutions

Internal Coupling Facility (ICF) 1997

Support for new workloads and open standards
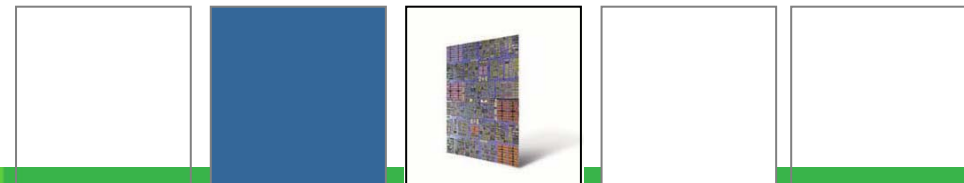
DB2 V8 exploitation of IBM zIIP can add value to database workloads

- **Portions of the following DB2 for z/OS V8 workloads may benefit from zIIP***
  1. ERP, CRM, Business Intelligence or other enterprise applications
     - Via DRDA® over a TCP/IP connection

New Specialty Engine

  2. Data warehousing applications*
     - Requests that utilize complex star schema parallel queries

  3. DB2 for z/OS V8 utilities*
     - Internal DB2 utility functions used to maintain index maintenance structures

- **Utilization of the zIIP is expected to be transparent to the application.**
  - No anticipated changes to applications that access DB2 for z/OS V8 data

* The zIIP is designed so that a program can work with z/OS to have a portion of its enclave Service Request Block (SRB) work directed to the zIIP. The above types of DB2 V8 work are those executing in enclave SRBs, of which portions can be sent to the zIIP.

System z9 EC helps address corporate data goals

- **Simplify infrastructure**
  - Capacity on demand – can add memory, capacity, I/O – with minimal downtime
  - Leadership capabilities to help improve access to data *
    - Dedicated I/O processor
    - 80% more bandwidth than the IBM eServer zSeries 990 (z990)
    - 40% more FICON® channels than the z990
    - Up to 56% reduction in response times and up to 125% improvement in I/O throughput using MIDAW facility

- **Helping lower risk of downtime**
  - Parallel Sysplex clustering and GDPS®
  - Superior access to applications via comprehensive protection from unplanned and planned outages
    - Enhanced book availability
    - Redundant I/O interconnect
    - Enhanced driver maintenance
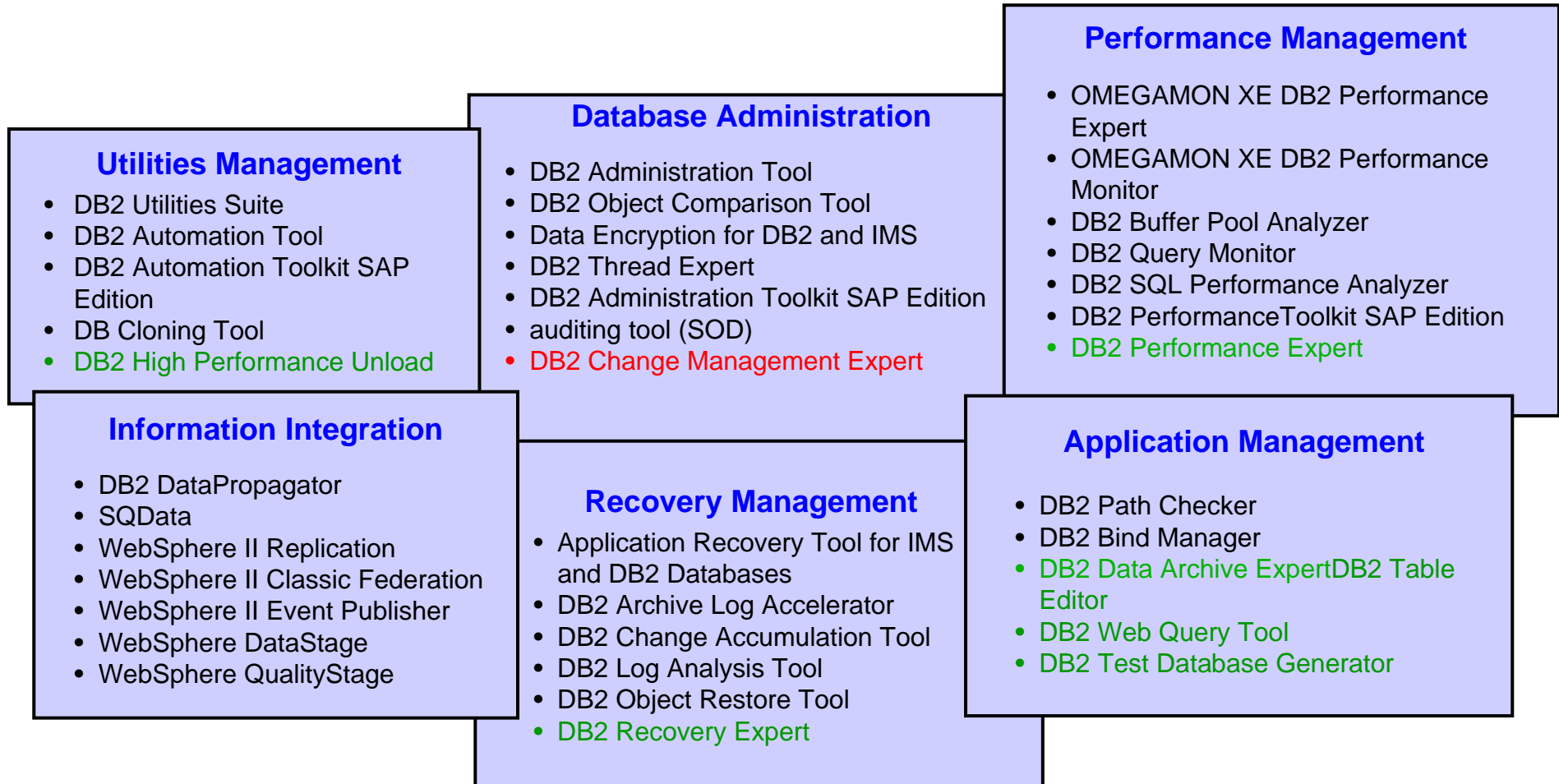
- **Helping address compliance**
  - Industry certifications and regulatory compliance
  - Advanced encryption support (AES)
  - Up to 6,000 SSL handshakes/sec. on new configurable cryptographic feature**
  - Protecting data you share outside your organization

•Performance is based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput or performance that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput or performance improvements equivalent to the numbers stated here.
•** The SSL rate was achieved with a System z9 with four processors and two Crypto Express2 Cards (one feature, both configured as accelerators). When a System z9 with four CPs and both PCI-X adapters on a Crypto Express2 feature are configured as accelerators, the Crypto Express2 feature is designed to perform up to 6,000 SSL handshakes per second.

Today's IBM DB2 Tools for z/OS and Multiplatform Product Portfolio

Performance Management

- OMEGAMON XE DB2 Performance Expert
- OMEGAMON XE DB2 Performance Monitor
- DB2 Buffer Pool Analyzer
- DB2 Query Monitor
- DB2 SQL Performance Analyzer
- DB2 PerformanceToolkit SAP Edition
- DB2 Performance Expert

Database Administration

- DB2 Administration Tool
- DB2 Object Comparison Tool
- Data Encryption for DB2 and IMS
- DB2 Thread Expert
- DB2 Administration Toolkit SAP Edition
- auditing tool (SOD)
- DB2 Change Management Expert

Utilities Management

- DB2 Utilities Suite
- DB2 Automation Tool
- DB2 Automation Toolkit SAP Edition
- DB Cloning Tool
- DB2 High Performance Unload

Information Integration

- DB2 DataPropagator
- SQData
- WebSphere II Replication
- WebSphere II Classic Federation
- WebSphere II Event Publisher
- WebSphere DataStage
- WebSphere QualityStage

Recovery Management

- Application Recovery Tool for IMS and DB2 Databases
- DB2 Archive Log Accelerator
- DB2 Change Accumulation Tool
- DB2 Log Analysis Tool
- DB2 Object Restore Tool
- DB2 Recovery Expert

Application Management

- DB2 Path Checker
- DB2 Bind Manager
- DB2 Data Archive ExpertDB2 Table Editor
- DB2 Web Query Tool
- DB2 Test Database Generator

Day 1 V9 Support !

Available on zSeries(shown on chart in black)
Available on zSeries and multiplatforms (LUW)
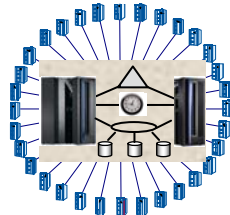**Currently available only on multiplatforms (LUW)**

DB2 9 for z/OS

❖**Business Insight**

❖**Cost Savings through Optimization**

❖**Business Resiliency**

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