Delivering Innovative Solutions to Meet Current and Future Market Demands

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Vice President, System z Worldwide Software

IBM Software Group

A Journey to a Smarter Planet

zEnterprise EC12: An optimized design which delivers unique value

Comprehensive integration enabling information-centric computing

Linux

z/OS

z/VM

AIX

Linux

z/VSE

z/TPF

Java

Rational

WebSphere

Information Management

Tivoli

Lotus.

Cognos.

| Semiconductor Technology | Microprocessor Design | Systems Design | Virtualization & Operating Systems | Compilers, Tools & Java Virtual Machine | Optimized Middleware |

DB2 11 and zEC12/BC12 Synergy

- Faster CPU – 1.25x compared to z196
    - 5.5GHz processors, bigger/faster cache
    - 25% reduction measured with DB2 workloads
- 50% More System Capacity to help consolidation
    - Up to 3TB real memory per server
    - Excellent synergy with DB2 10 and 11 scalability
- New Features that DB2 Exploits
    - FLASH Express and pageable 1MB frames, used for:
        - Buffer pool control blocks
        - DB2 executable code
    - 2GB frame support for buffer pools
        - Performance improvement expected for extremely large memory sizes

- New zEC12 GA2 features that benefit DB2
    - zEDC Express for enhanced DB2 SMF data compression
    - RoCE Express for faster, cheaper z/OS to z/OS DRDA communication
        - Preliminary measurements show up to 2x DRDA transaction throughput increase
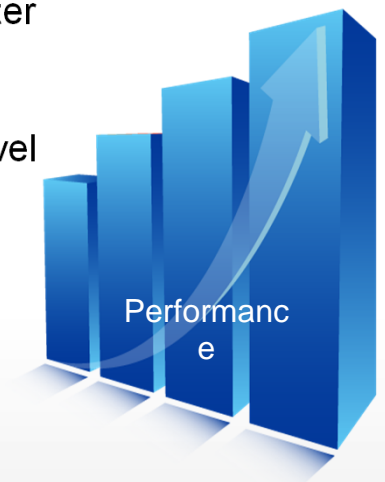
Improve performance of COBOL applications

Deploy business critical COBOL applications optimized for target System z servers to shorten processing time and reduce operating cost

Modern, advanced optimization

- Based on proven compilation technology shipped in Java on System z since 2006
  - Provides COBOL-specific optimizations
  - Enables COBOL users to fully exploit z/Architecture

- Provides significant performance improvements over Enterprise COBOL V4[1]
  - Many well structured, CPU-intensive batch applications have shown performance increases greater than 10%
  - Many numerically intensive programs have shown performance increases greater than 20%
  - Better exploitation of z hardware, specifically z10, z196, z114, zEC12, zBC12
  - Savings to customers in terms of CPU utilization and ability to meet Service Level Agreements.

- Provides a solid framework to enable timely delivery of z/Architecture exploitation and advanced optimizations
  - Lays groundwork for delivering release-to-release performance improvement roadmap for COBOL on System z

Performance

[1] Results are based on an internal compute-intensive test suite. Performance results from other applications may vary.

Operating systems focused on exploiting

z/OS Version 2.1 & z/OSMF 2.1 **NEW**

- Fast memory to memory data transfers with SMC-R (like HiperSockets™ between processors)
- Handle huge volumes of data with 100-way (SMP) support in a single LPAR
- Shorten batch windows with 40% shorter file recall time
- Improve SAP workload performance with 175x faster zFS V5 directory lookup
- Leverage Crypto-as-a-service for Linux® to extend IBM System z® reach as a crypto hub

z/VM® Version 6.3 *openstack CLOUD SOFTWARE*

- Supports more virtual servers than any other platform in a single footprint with support for 1TB of real memory,
- Increased performance for large VMs with a 4x increase in memory scalability while maintaining greater than 90% resource utilization
- More efficient use of CPU resources for better price performance

60%
reduction in MIPS requirement for host system size

$1.00/day
for a virtual Linux server

520
Linux virtual servers on zBC12 with 40 virtual servers per IFL.

How Customers are Leveraging System z Transactions and Data Today

Did you know, on z/Linux. we're seeing exciting growth with Worklight In 4Q13, z/Linux accounted for 45% of all IBM Worklight revenue

150M monthly mobile banking transactions with **< 30 milliseconds** end-to-end response time

System z is the Smartphones Coolest Accessory **and the foundation for a mobile enterprise**

- Avoids **$1.5M** per year in energy costs, while growing mobile transactions

Brings the branch to the client and enables personalized services to support **10M** new customers

New B2E mobile based inventory management system on System z keeps shelves freshly stocked with what customers want, saves over **2.4M** per year for ROI in only **16 days**

Mobile workloads Impact Systems differently than web workloads.

- Increase in peak and off-peak transactions. Expect 10-50% growth as you add a mobile channel.

- Increased query or "read-only" transactions. As many as 50% of mobile transaction could be "read-only".

- Unanticipated spikes in workload due to popular apps, features or special offers. No traditional times for workload spikes.

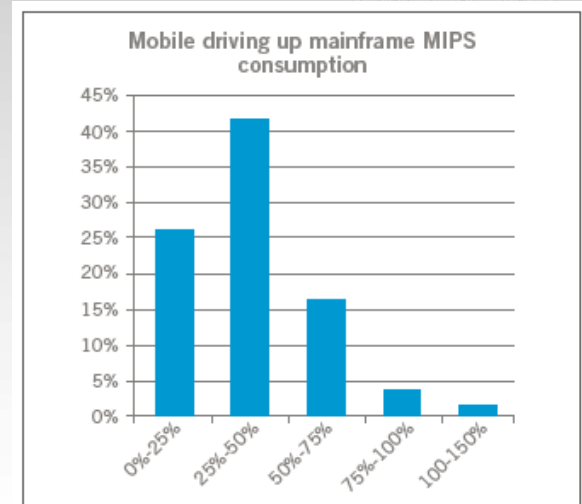- Inefficient applications written by "non-professional" coders. Drives up transaction rates.

Chart 7: The increased use of mobile applications has increased MIPS consumption by more than two-fifths (41 percent), with 2 percent saying it has more than doubled.

Chart 4: 91 percent of CIOs say now that customer-facing applications are using the mainframe and performance expectations on it have increased.
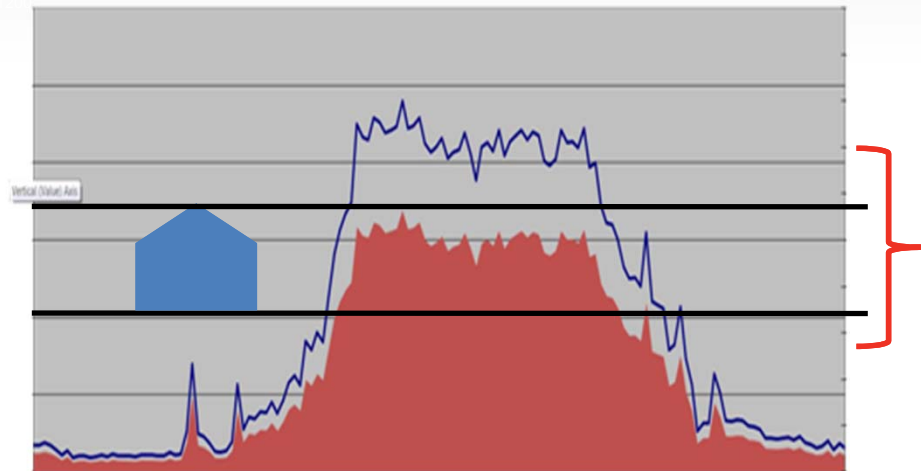
New System z Mobile Workload Pricing

enables IT investments to scale with growth & business returns of mobile

Improving the economics of mobile computing

NEW

No Infrastructure Changes Required

Up to 60% reduction in incremental growth from mobile transactions

Build an Enterprise infrastructure for Mobile, Web, and Cloud Applications

IBM WebSphere Liberty z/OS Connect

New

Rapid and secure enablement of web, cloud and mobile access to z/OS assets

Discover z/OS assets
Simplified connection
Auditing and chargeback

Embedded in z/OS middleware:
CICS, IMS, WebSphere Application Server
Batch, UNIX applications

IBM WebSphere Application Server for z/OS v8.5

New

Adopting a continuous delivery model to deliver new features and function for mobile and cloud applications

IBM CICS Transaction Server for z/OS v5.2 New

Service agility to integrate mobile capabilities and broaden the web programming model

IBM Operational Decision Manager for z/OS v8.6 New

Capture, automate and govern frequently occurring, repeatable business decisions

IBM MQ for z/OS v8.0 New

Deliver a flexible service-enabled business via integration of heterogeneous applications

System z – Surviving even the most devastating Japan earthquake!

Continuous Availability over Unlimited Distances with Active Sites Technology

Expand System z continuous availability solution that provides time to recovery in seconds with automated query workload balancing across multiple data centers.

- New automated query workload balancing across data centers through the latest release of GDPS Active-Active Continuous Availability with **IBM Multi-site Workload Lifeline v2.0**

- Improved non-relational z/OS data integration and replication of data between IMS and VSAM databases with **InfoSphere Data Replication and Federation Solutions for z/OS**

- New network automation, and network and systems management among systems with **NetView Monitoring for GDPS**

  - .

Automated multi-site continuous availability and workload distribution

NEW

GDPS / Active-Active

Enhanced Resilience for zLinux/zVM

xDR

Storage CA solution

GDPS/ HyperSwap Manager

Zero dataloss Metro distance CA/DR solution

GDPS/PPRC

GDPS/MGM

GDPS/MzGM

3-site solution

GDPS/GM

GDPS/XRC

Disaster Recovery solution Unlimited distance

Best in class enterprise messaging solution for z/OS environments

IBM MQ for z/OS v8.0

- Delivering a flexible service-enabled Business via integration of heterogeneous applications

- Rapid, reliable, simple, secure exchange of data across applications, systems and services

- Simplify development via functionally rich, easy-to-use and consistent messaging layer

- Respond to peaks in transaction workloads through scaling capabilities such as clustering

Enterprise Messaging

New

What's new in IBM MQ for z/OS v8.0

- ✓ *Exploit System z capabilities to improve manageability and performance*

- ✓ *Improved throughput, scalability and operational tasks*

- ✓ *Enhanced security, increased connectivity, and support for new standards*

DB2 11: The Database for Enterprise OLTP and Analytics

Affordable for every workload with out-of-the-box savings

- Up to10% for complex OLTP
- Up to15% for update intensive batch
- Up to 40% for queries

Business critical analytics

- Expanded SQL, XML and analytics capabilities
- Hadoop integration, NoSQL/JSON support
- In-transaction real-time scoring
- Advanced analytic capabilities with mobile support

Enhanced Resiliency and Continuous Availability

- Fewer planned outages, fewer REORGs, faster recovery
- Transparent archiving, access warm/cold data in single query

Simpler, faster upgrades for faster ROI

- 16x faster catalog migration
- No application changes required for DB2 upgrade
- Product quality and stability – raised the bar

Announce Oct. 1

GA Oct. 25

Day 1 SAP Certification

DB2 11: The Database for Big Data & Analytics

Big Data
System z
IBM DB2
Business Analytics
Availability
Security
Resiliency
DB2 11

- Performance improvements
- Enhanced continuous availability
- Sophisticated business analytics
- Simpler, faster DB2 upgrades

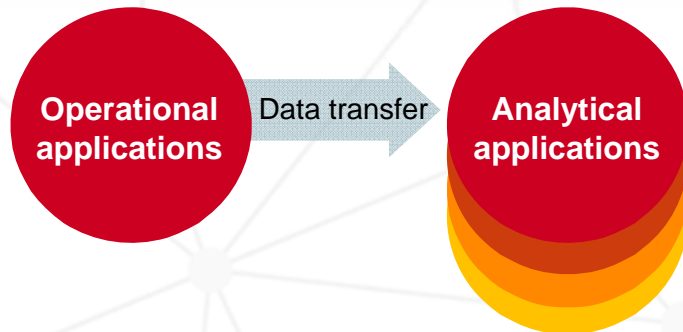Cristian Molaro, Surekha Parekh, Terry Purcell & Julian Stuhler

Bring analytics to the data rather than the data to the analytics

Extract, Transform and Load (ETL)

1TB ETL per day, Initial copy plus three derivatives costs >$8 million over 4 years

Operational applications → Data transfer → **Analytical applications**

Multiple copies of data

Transaction and analytics isolation

Significant compute power

Source: CPO internal study. Assume dist. send and load is same cost as receive and load.. Also, assume 2 switches and 2 T3 WAN connections.

The most valuable insights occur when the analysis executes where the data originates

72%

of respondents plan to analyze transactional data from enterprise applications

80%

of world's corporate data resides or originates on mainframes

In-database scoring for both historical data and real-time transactional data

Support for both in-transaction and in-database scoring on the same platform
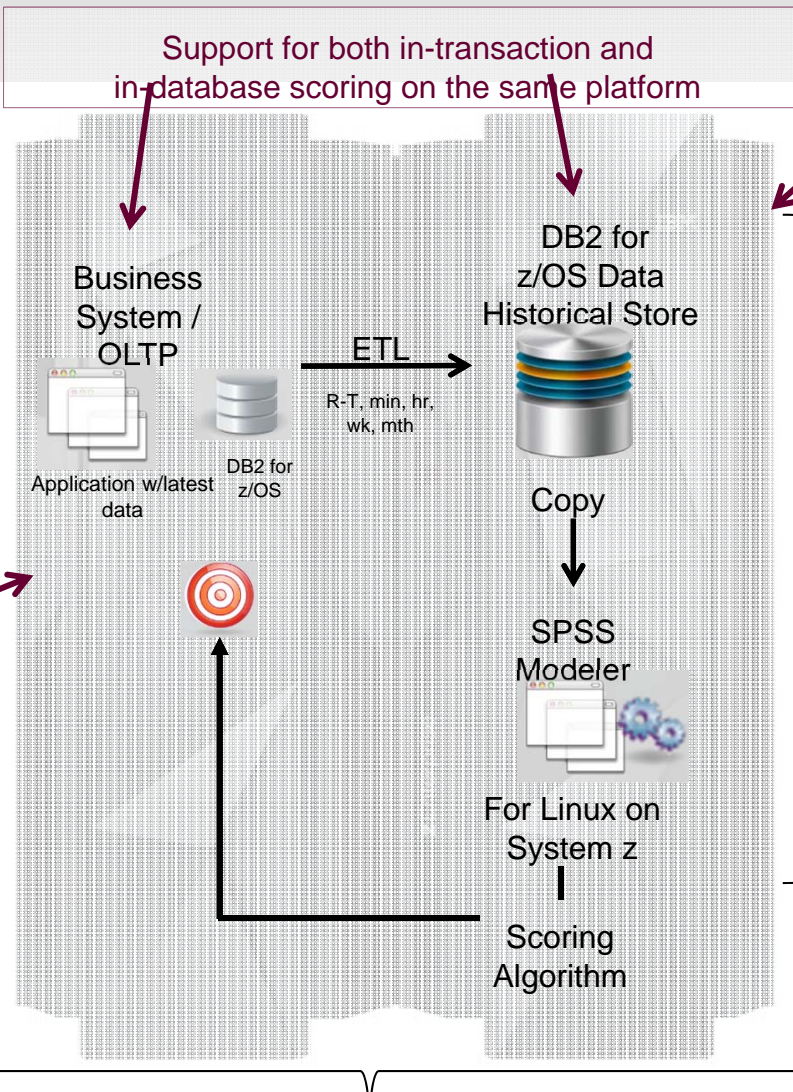
End to end solution

Customer Interaction

Data In

Business System / OLTP

DB2 for z/OS Data Historical Store

ETL

R-T, min, hr, wk, mth

Application w/latest data

DB2 for z/OS

Copy

Real-Time Score/ Decision Out

SPSS Modeler

Reduced Networking

Meet & Exceed SLA

For Linux on System z

Scoring Algorithm

Consolidates Resources

Integrating Big Data Analytics with DB2 for z/OS

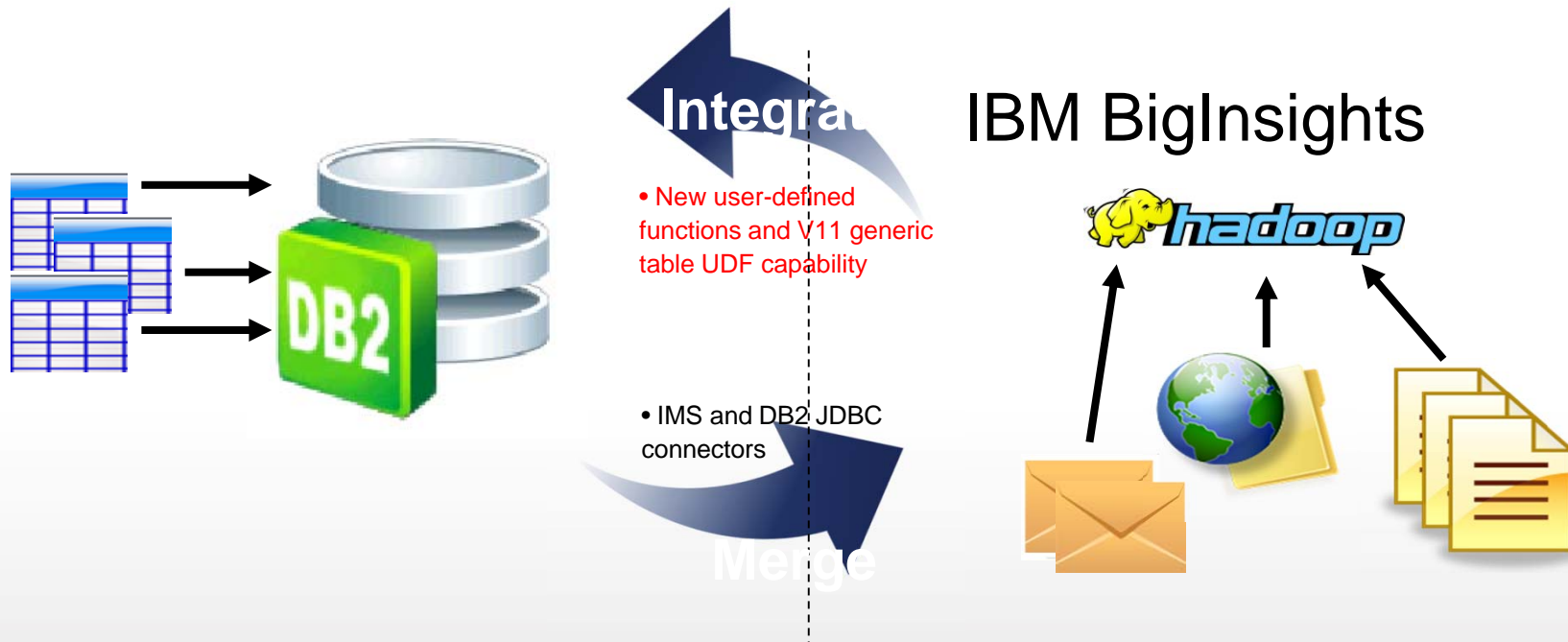| •	Much of the world's operational data resides on z/OS	Unstructured data sources are growing fast

- **Two significant needs:**
  1. Merge this data with trusted OLTP data from zEnterprise data sources
  2. Integrate this data so that insights from Big Data sources can drive business actions

New V11 features enable this

- **Connectors to allow BigInsights to easily & efficiently access DB2 data**

- **DB2 is providing the connectors & the DB capability to allow DB2 apps to easily and efficiently access hadoop data sources**

Integrate

IBM BigInsights

- New user-defined functions and V11 generic table UDF capability

- IMS and DB2 JDBC connectors

Merge

Optimize and Innovate with IMS

IBM.

IMS 13

delivers…

- **Speed & scalability**
  - **117,292 TPS on a single system!**
    - **800%** increase over IMS 12
  - Increased workload throughput by **130%**

- **Affordability**
  - **10%** CPU savings for traditional workload
  - **62%** CPU savings for Java workload
  - Value Unit Editions available for IMS DB and IMS TM

- **Simplicity**
  - Deliver IMS apps and data to mobile and cloud developers in a secure, governed, and optimized way with the IMS Mobile Feature Pack
  - Native SQL from COBOL
  - Dynamic database management

IMS 13 – available today! (GA 4Q2013)
Beta (QPP) experience
  - *Highest quality rating (94/100) in IMS history*
  - *Three IMS 13 clients in production prior to GA*

Adoption
  - *The fastest adoption rate of recent releases with 75 clients and partners already on IMS 13*

IMS vNext – QPP Announce in 4Q2014
Optimize and extend the value of your IMS investment in the era of Data, Cloud & Engagement

- *Simplified, standards-based management and integration for hybrid cloud, analytics, mobile, and big data*
- *Improved IMS TCO and Qualities of Service*

IMS Global
IBM.

Join us on LinkedIn

"With **IMS** as our core orchestration and business logic execution layer, we have **true 24/7 service capability** and the ability to manage growth without worrying about scalability."
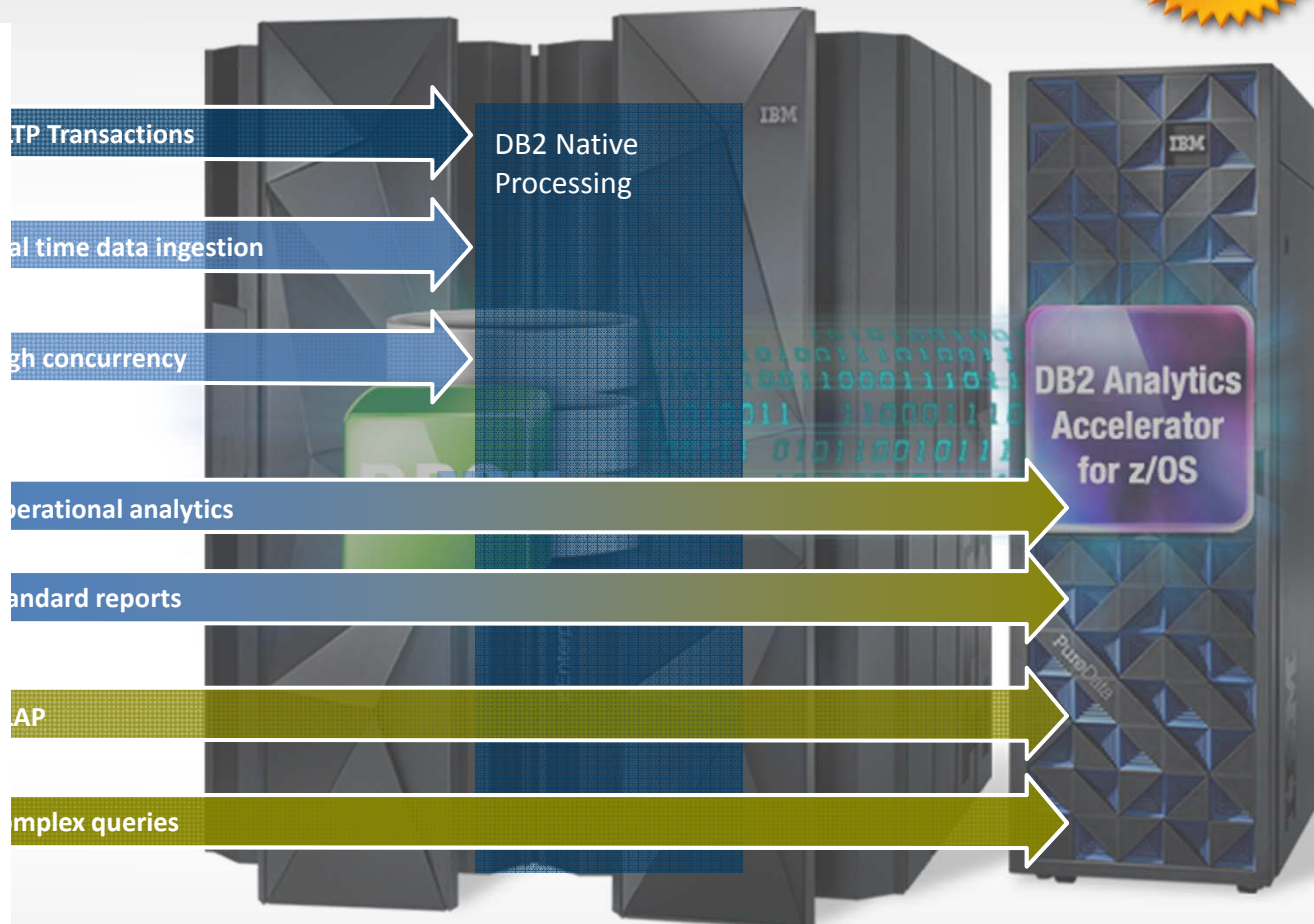
- Jay Prag, CIO Hogan Channels, FNB

FNB

An easy entry point into zEnterprise analytics
A single, workload-optimized system for both operations AND warehousing

NEW

OLTP Transactions →

al time data ingestion →

gh concurrency →

DB2 Native Processing

perational analytics →

andard reports →

LAP →

mplex queries →

DB2 Analytics Accelerator for z/OS

- **CPU savings** for DB2 query workloads including short running operational analytics and reporting **now with static SQL, multi-row FETCH, and multiple encodings on the same Accelerator**

- **DB2 analytics accelerator benefits** data warehouse, OLAP and complex queries with **improved enterprise robustness, scalability and high performance storage saver**

IDAA 2014 **Update** [1] **- Highlights**

Enterprise Security for business critical data

- **Augment Security and improve Performance with new PureData Technology**
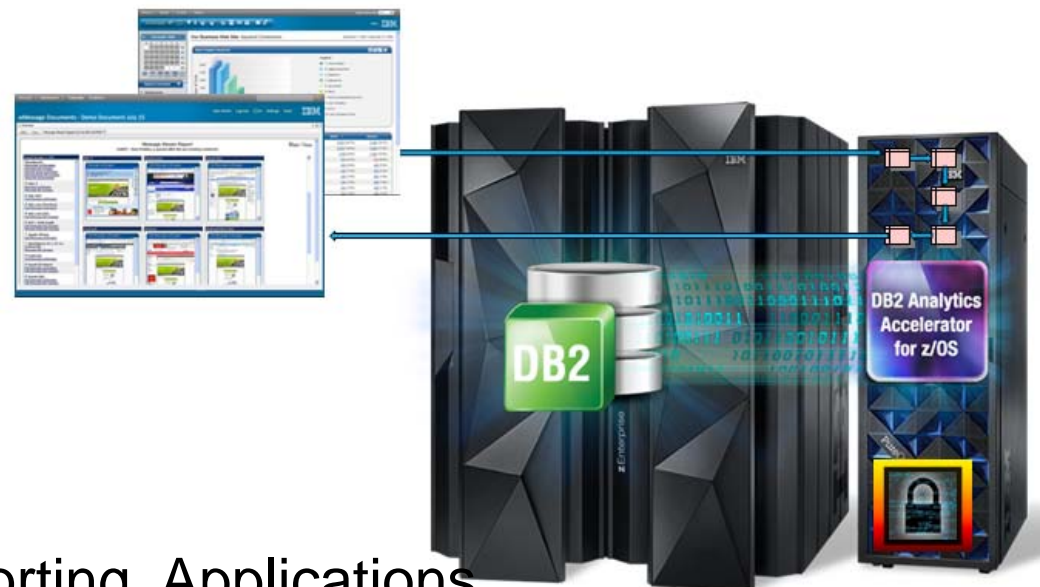 - Extend advanced security with encryption of data at rest while taking advantage of the legendary built-in security of System z
  - Up to 2X performance improvement for CPU intensive workloads and load rates

- **Enhance Systems Management Capabilities**
  - Faster data synchronization and data load (Incremental Update)
  - Improved serviceability with automatic „Call Home" capability

- **Accelerate Multi-Step-Reporting Applications**
  - Extend Accelerator scope to speed up IBM Campaign, MicroStrategy and complex custom reporting applications
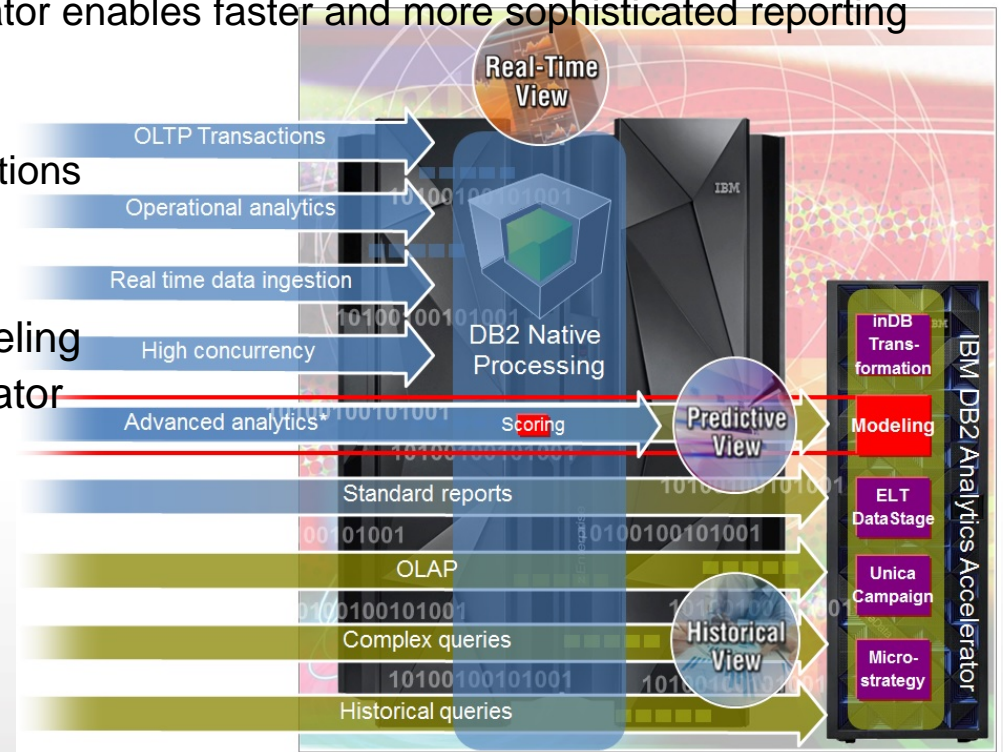
[1] **delivered as V4.1 PTF 4**

IBM DB2 Analytics Accelerator V5.1 - Highlights

System z: A single workload-optimized system
for accelerating decisions to the speed of business

Support full lifecycle of a real-time analytics solution on a single, integrated system combining transactional data, historical data and predictive analytics

- In-database transformation on the Accelerator enables faster and more sophisticated reporting and allows for deep application integration

- Acceleration of Predictive Analytics applications
    - Enables In-database analytics, SPSS / Netezza Analytics(INZA) data mining and in-database modeling to be pushed down to the Accelerator

- Online Schema Change provides significantly faster table updates for real-time analytics

System z delivers an Open Cloud infrastructure

IBM

Integrate	**Automate**	**Orchestrate**

IBM Products & Offerings

Integrate
- IBM zEnterprise®: zEC12, z196, zBC12, z114
- Linux® on System z
- CSL Wave – hypervisor manager (new acquisition)
- xCAT – services offering to support z/VM

Automate
- Tivoli® Provisioning Manager
- Cloud Ready for Linux on System z
- Tivoli Application Management for zEnterprise
- Tivoli Asset and Financial Management for zEnterprise

Orchestrate
- Tivoli Application Resilience for zEnterprise
- Tivoli Security for zEnterprise

NEW

z/VM® 6.3

SmartCloud Entry
SmartCloud Provisioning

SmartCloud Orchestrator

System z support currently in development

openstack™ CLOUD SOFTWARE

OpenStack®
- Being enabled for z/VM first and eventually zManager
- Being used as a code base for SCE / SCP / SCO

Simplified zEnterprise support with enhanced analytics and cloud workload management

Up to 75% savings in time to find problems

90 mins to 2 mins to fix problems on CICS transactions

zEnterprise wins Tech Innovator Award for Cloud Solutions

NEW! OMEGAMON Performance Management Suite v5
Improved visibility and management for z/OS and subsystems, including support for IBM zAware

NEW! Cloud Management Suite for System z
Easily moves cloud services to System z with standardized, open orchestration by provisioning workloads to zLinux from SmartCloud Orchestrator running on x.

NEW! Tivoli Workload Scheduler for z/OS V9.2
Enhanced automation, monitoring and control of composite workflows, including support for Cloud

Unmatched security and availability for trusted computing in the digital era

99.999%
Design point for
application availability

Encryption
Of data at rest or in flight

Security

**NEW! InfoSphere
Guardium V9.1**
Enhanced protection of high-value data and automated compliance policies

**ENHANCED! IBM
zEnterprise Smarter
Analytics for banking**
Optimized Fraud Detection and Prevention on System z with enhanced fraud detect rules, models & orchestration

Advanced encryption for new payment methods

Continuous delivery of software-driven innovation

Over 50%
of projects are over budget and often lack critical features

45%
experience delays due to troubleshooting and fine-tuning issues in production

DevOps

ENHANCED! Rational Developer for System z v9.0.1 and Rational Developer for the Enterprise *New out-of-the-box debugging capabilities with a new powerful and modern GUI-based debugger*

ENHANCED! Rational Team Concert Enterprise v4.0.6 *Lifecycle automation, collaboration and traceability from conception to deployment*

ENHANCED! UrbanCode Deploy v 6.0.1 *Provides support for deployment of Java and WAS on z/OS, common in multi-tier applications*
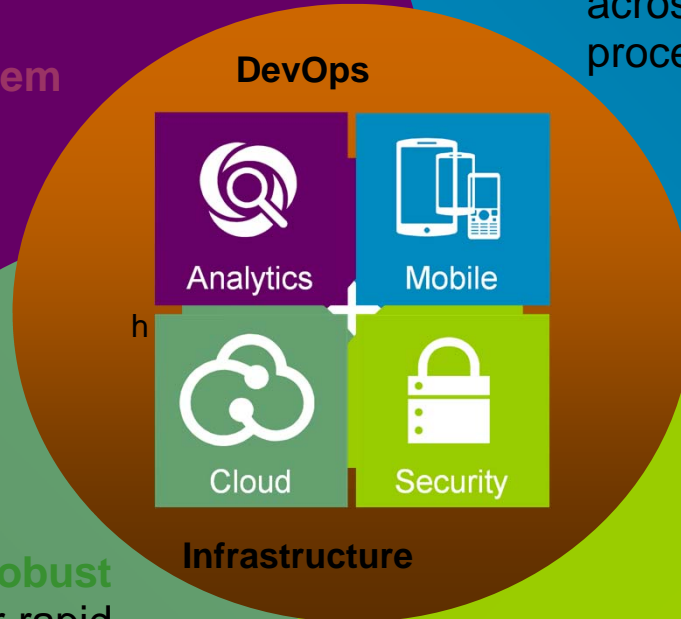
Nationwide®

Improved code quality by 50% over a three-year period

Create a competitive advantage in the digital era

Operational and analytics applications reside with the data in **a single fully virtualized system**

Creating **Intelligent interaction** in transactions integrated across mobile & core processes

DevOps

Analytics

Mobile

Cloud

Security

Infrastructure

A **flexible and robust** infrastructure for rapid delivery of high quality services

A **trusted computing** platform to support secure growth in transactions and data

…make the extraordinary possible!!!

zEnterprise

IBM

Thank You