

A decorative graphic in the top left corner consists of several overlapping circles of various colors (yellow, orange, red, purple, blue) that are divided into segments, resembling stylized sunbursts or data points.

Delivering Innovative Solutions to Meet Current and Future Market Demands

Ray Jones

Vice President, System z Worldwide Software , IBM
Software Group



It all started with a
\$5 billion dollar bet.

IBM
System/360™



PR/SM
Virtualization



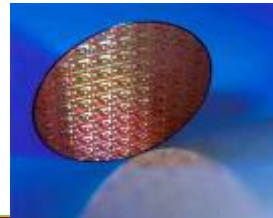
CICS, DB2, &
IMS



Parallel
Sysplex



Bipolar to
CMOS



Capacity on
Demand



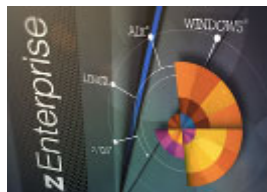
Linux



Java



Hybrid with
zBX



IDAA



IBM zEnterprise
EC12 & zBC12



Constant evolution driven through
co-creation with our clients



Strategic Priorities for System z.



Enhance ... Optimize ... Expand.

Operational analytics capabilities

Dynamic and efficient shared hybrid computing infrastructure such as Clouds

Capacity, throughput to handle high-volume mobile workloads

Continuous Availability Innovations

Intelligent, secure data vault with auditable protection

High Productivity Development Operations for Hybrid Applications

Efficient at Scale

Operational Analytics

Ultimate Security

zEnterprise EC12: An optimized design which delivers unique value

Comprehensive integration enabling information-centric computing

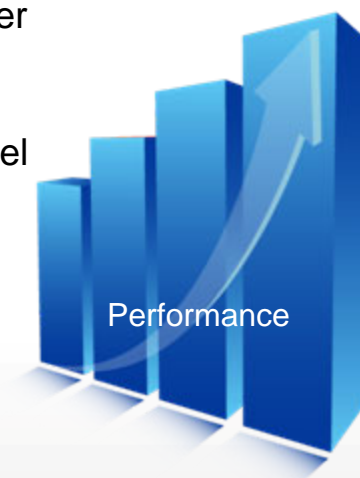


Improve performance of COBOL applications

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 V4¹
 - 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



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

New innovations available on zBC12 and zEC12



Do a Proof of Concept Today



NEW

Data Compression Acceleration

Reduce CP consumption, free up storage & speed cross platform data exchange to compress data

Up to **4X** system data compression

NEW

High Speed Communication Fabric

Optimize server to server networking with reduced latency and lower CPU overhead

Up to **80%** reduction in network latency

ENHANCED

Flash Technology Exploitation

Improve availability and performance during critical workload transitions, now with dynamic reconfiguration; CF exploitation

Up to **10X** faster response time and **37%** increase in throughput vs. disk

ENHANCED

Proactive Systems Health Analytics

Increase availability by detecting unusual application or system behaviors for faster problem resolution before they disrupt business

2 clicks vs. hours to find difficult or unusual problems

NEW

Hybrid Computing Enhancements

x86 blade resource optimization; Alert & notification for blade virtual servers; Latest x86 OS support; Expanding future roadmap; DataPower Virtual Appliance SoD

Up to **84%** lower TCA with fit-for-purpose cloud architectures

NEW

zIIP & zAAP Specialty Engines:

New 2:1 ratio for zIIP/zAAP to CP for improved new workload economics

Operating systems focused on exploiting



z/OS Version 2.1 & z/OSMF 2.1



- 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



- 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

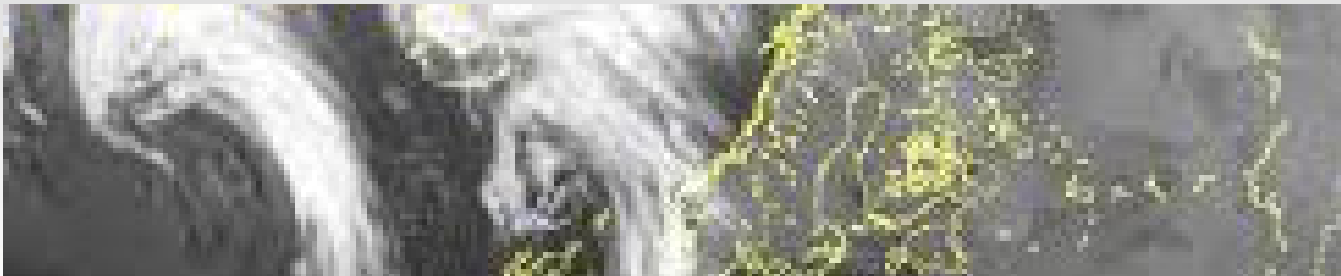
for a virtual Linux server

520

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



The Met Office: forecasts a bright outlook for Linux on zEnterprise



Need:

Consolidate its distributed infrastructure to tailor its weather forecasts for specific client needs

Solution:

Migrated its distributed 204 x86 processor cores (Linux landscape) onto a pair of zEnterprise 196 servers with 17 IFLs lowering hardware lifecycle costs

Factor of 12 reduction in licensing costs

Manageable Linux landscape

“The amount of money you spend on distributed systems can be staggering. You’re not only looking at licensing costs, but also the lifecycle and resilience aspects.it just made sense to move the workload to the mainframe.”



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

230M 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 System z differently than web workloads.

- Increased transactions. Increase in 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.

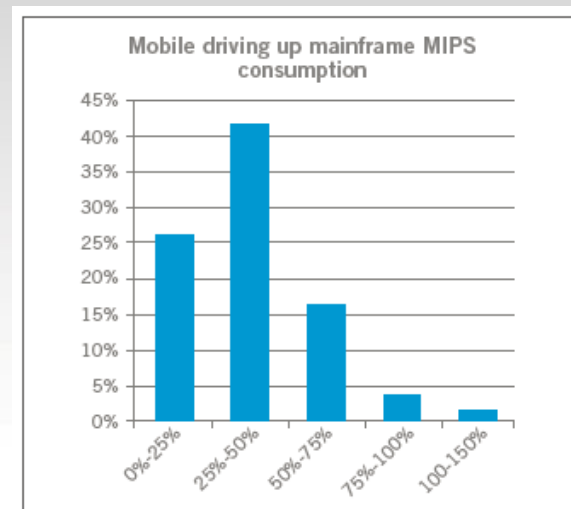


Chart 7: The increased use of mobile applications has increased MIPS consumption by more than two-fifths (41 percent), with 2 percent saying it has more than doubled.

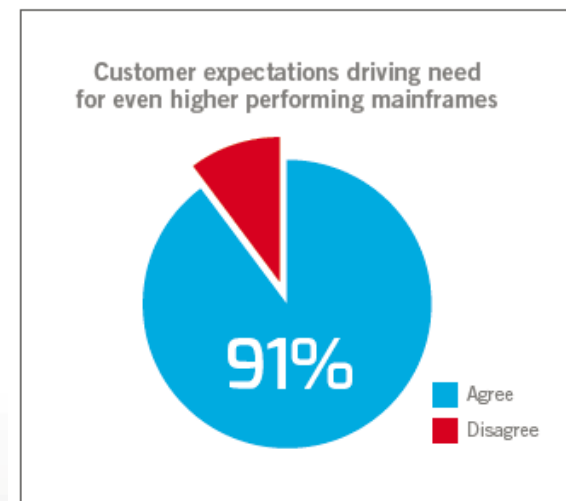


Chart 4: 91 percent of CIOs say now that customer-facing applications are using the mainframe and performance expectations on it have increased.



New System z Mobile Workload Pricing

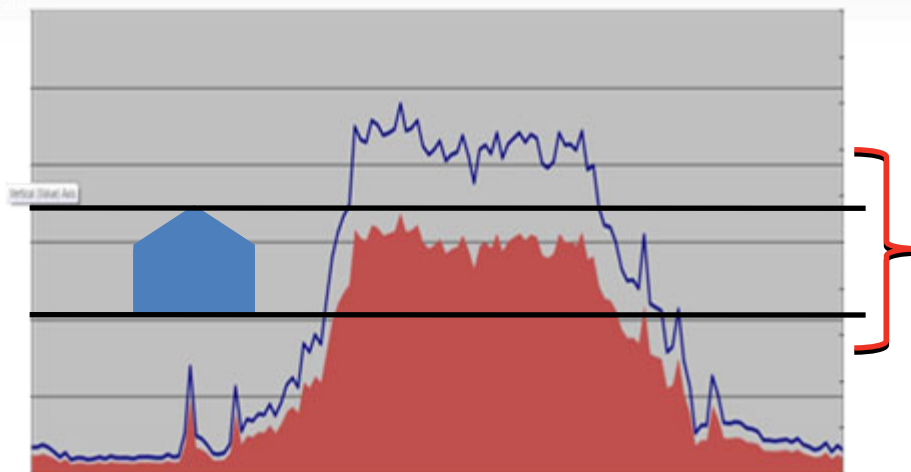


enables IT investments to scale with growth & business returns of mobile



No Infrastructure Changes Required

Improving the economics of mobile computing



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

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

New

IBM WebSphere Application Server for z/OS v8.5

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

New

IBM CICS Transaction Server for z/OS v5.2

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

New

IBM Operational Decision Manager for z/OS v8.6

Capture, automate and govern frequently occurring,
repeatable business decisions

New

IBM MQ for z/OS v8.0

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

New

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



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*

New

Service agility and operational efficiency, with mobile and cloud enablement for CICS TS

IBM CICS Transaction Server for z/OS v5.2

- Service agility to integrate mobile capabilities and broaden the web programming model
- Operational efficiency via security standards and automatic safeguarding of resources
- Cloud enablement to deploy, manage and execute multi-program applications
- Simplified development and maintenance via powerful programming and debug tools



What's new in IBM CICS Transaction Server for z/OS v5.2

- ✓ *Enhanced Java support enabling portability of web applications into CICS*
- ✓ *Expanded policy thresholds and distributed security standards support*
- ✓ *Enhanced application lifecycle management and resource utilization*



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**





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

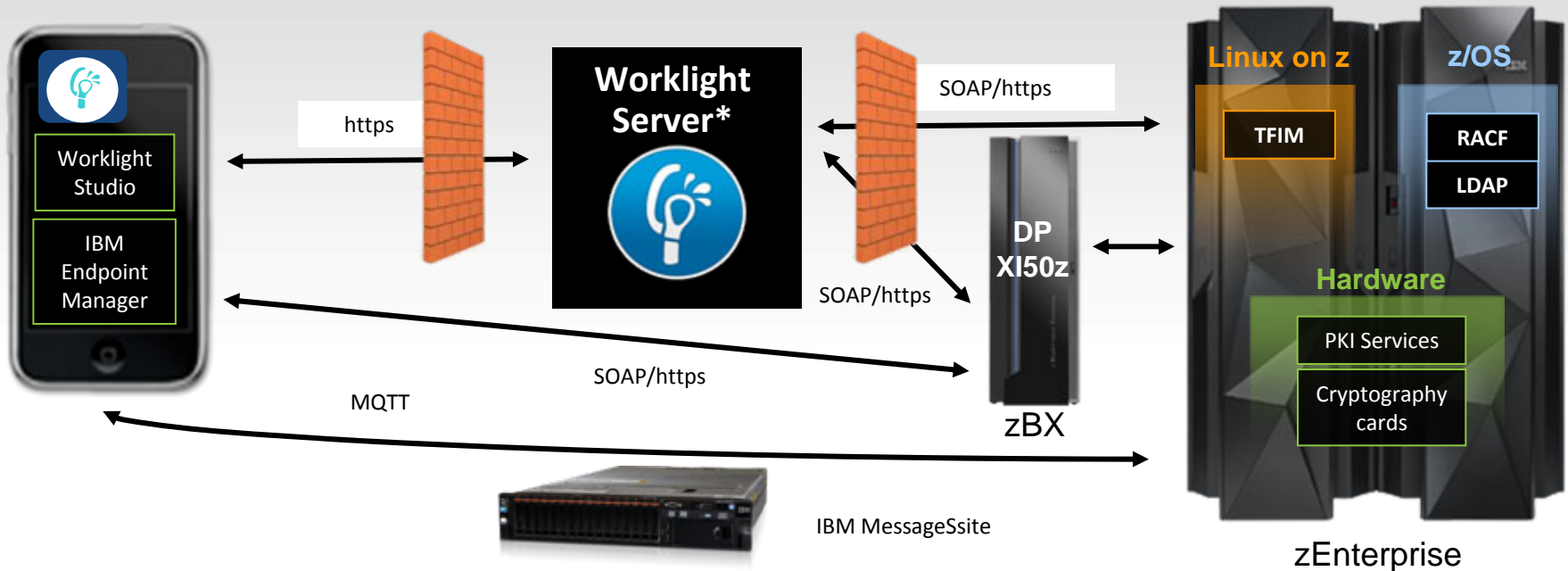
Optimized Fraud Detection and Prevention on System z with enhanced fraud detect rules, models & orchestration



vantivTM

Advanced encryption for new payment methods

End to end security from mobile to the mainframe



- **End to end capability of mobile users identity permits, syncing of LDAP, auditing of transactions, and simplified identity mapping with RACF®**
- **Advanced scalability of encryption processing with System z cryptography cards**
- **Centralized certificate management with z/OS PKI services**
- **Secured integration gateway for System z services, centralized key management and mobile access policy capabilities with DataPower XI50z**
- **High level security to backend applications via HiperSockets or IEDN support with Worklight Serve3**
- **Open Source Data Base security with Guardium**

**Worklight Server can also reside on Linux on z*



Core data management solutions for the 21st Century



DB2 11



IMSTM 13

Unmatched availability, reliability, and security for business critical information

Delivering the highest levels of performance, availability, security, and scalability in the industry

- **Up to 20% CPU reductions and performance improvements** for online transaction processing (OLTP), batch, and business analytics
- **Improved data sharing performance** and efficiency
- **Integration with InfoSphere BigInsightsTM / Hadoop and noSQL support**
- **Improved utility performance** and additional zIIP eligible workload

- **CPU reductions up to 15%** for Java applications, and additional SQL support
- **Improved efficiency** with native SQL access to IMS data from COBOL applications
- **Greater flexibility and faster deployment** for new applications with database versioning



BMW Group manages a mountain of data driven by apps for drivers, sustainability and eco-drive initiatives



Need:

Develop a sustainable and smarter driving strategies through mountain of data created by these innovations

Solution:

implemented IBM® DB2® 11 for z/OS® on zEnterprise eC12, which offers optimized management of information and workload and enhanced cost savings with capabilities for analytics, forecasting and reporting.

Up to **11%** reduced workload processing

24/7 support for constant increase in workloads

Efficient decompression algorithms

“ With DB2 11 the combination of the ability to break into persistent threads and the enhanced dynamic schema change capabilities allow us to react to business requirements more quickly and with less operational impact.... ”



GAD upgrades database systems to boost power and productivity



Need:

Address performance and capacity needs due to growing transaction volumes and 24/7 availability

Solution:

Upgraded to IMS 13 and DB2 11 to speed banking application rollouts while supporting peak transactions of 400 to 600 per second

10% higher annual transactions volumes with existing CPU capacity

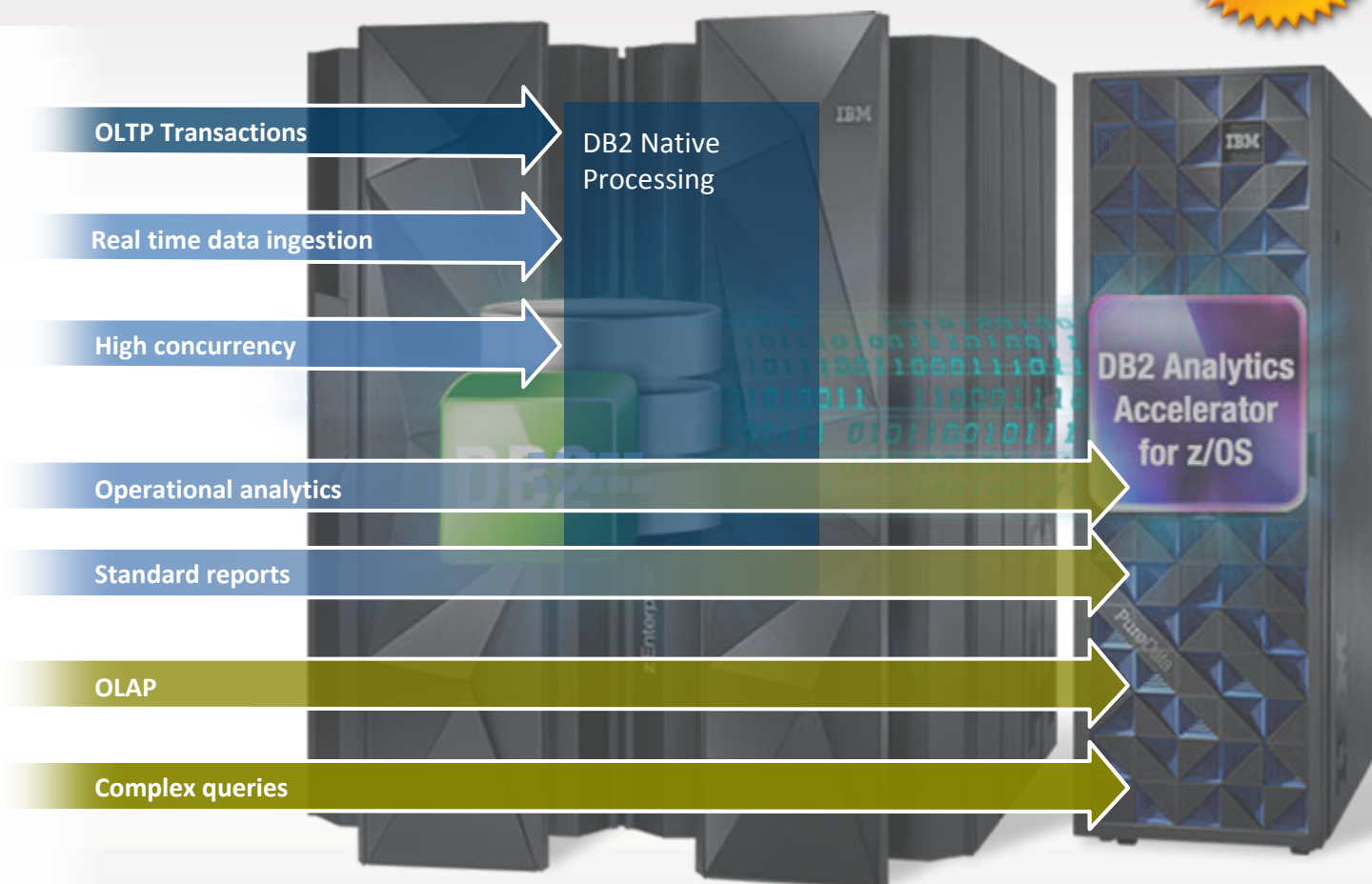
24/7 system availability performance with increased staff productivity

Integrating diverse platforms, applications and technologies to deliver maximum customer value



An easy entry point into zEnterprise analytics

A single, workload-optimized system for both operations AND warehousing



- **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**



Deliver more strategic insights at
unprecedented speeds and cost efficiency

**Extremely
fast**

Query results

Extensive

Predictive analytics
platform on Linux on z

Big Data and Analytics

**NEW! IBM Smartcloud
Analytics Family : IBM
Log Analysis zOS
Insight Packs V1.0.0**

*Valuable information from
z/OS logs to decrease risk
of outage and increase
productivity*

NEW! SPSS Modeler 16

*Easy-to-use-interface with
expanded analytical
capabilities and sophisticated
data simulation to discover
patterns and trends in
structured and unstructured
data*



PETROL

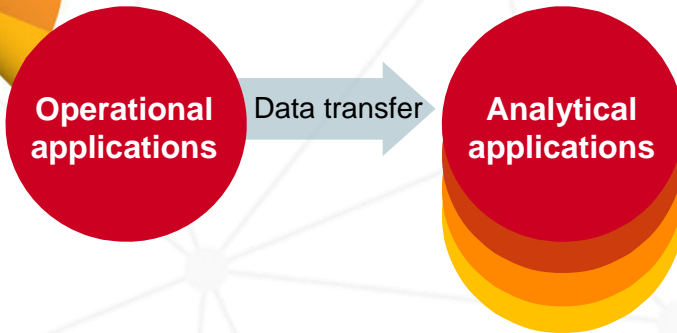
**Accelerated
queries
resulting in
increased
sales**

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



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



System z delivers an Open Cloud infrastructure



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



z/VM® 6.3

SmartCloud Entry
SmartCloud Provisioning

SmartCloud Orchestrator
System z support currently in development



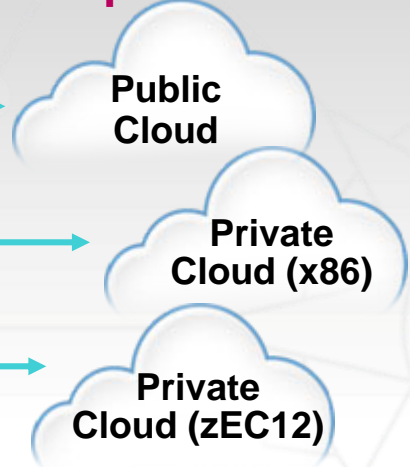
- OpenStack®
- Being enabled for z/VM first and eventually zManager
- Being used as a code base for SCE / SCP / SCO

Public vs. private cloud: Which option costs less to deliver mixed workloads?



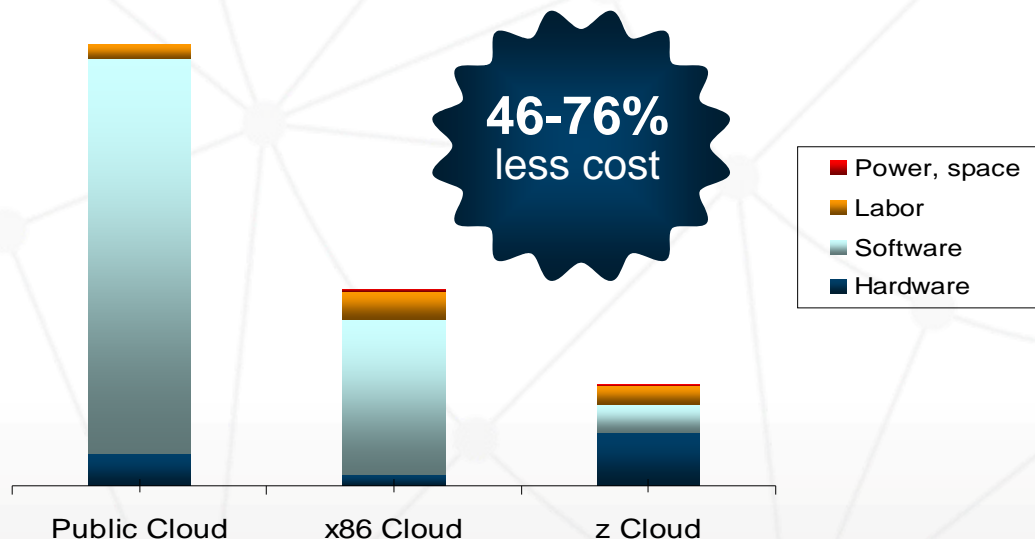
201 light workloads

24 heavy I/O workloads



Nationwide[®]
On Your Side[™]

Case Study: 225 workloads



Saving \$46M in capital and operational expenditure with an infrastructure that is optimized for diverse computing needs

Server configurations are based on consolidation ratios derived from IBM internal studies. Prices are in US currency and will vary by country. Amazon case includes costs of hardware (instances, data in/out, AWS support, free tier/reserved tier discounts), middleware and labor. zEnterprise and x86 cases include costs of hardware (OS, virtualization, cloud mgmt), middleware, power, floor space and labor.



System z: The Multidimensional Cloud



SOFTLAYER®

Hybrid

0	0
1	1
0	0
1	1
0	0
1	1
1	1
1	1
1	1
0	0
0	0



Cloud with zLinux

Software as a Service

DevOps

App Dev cloud
Maximize efficiency by tapping unused resources

z/OS cloud
Core business operations enabled as cloud services

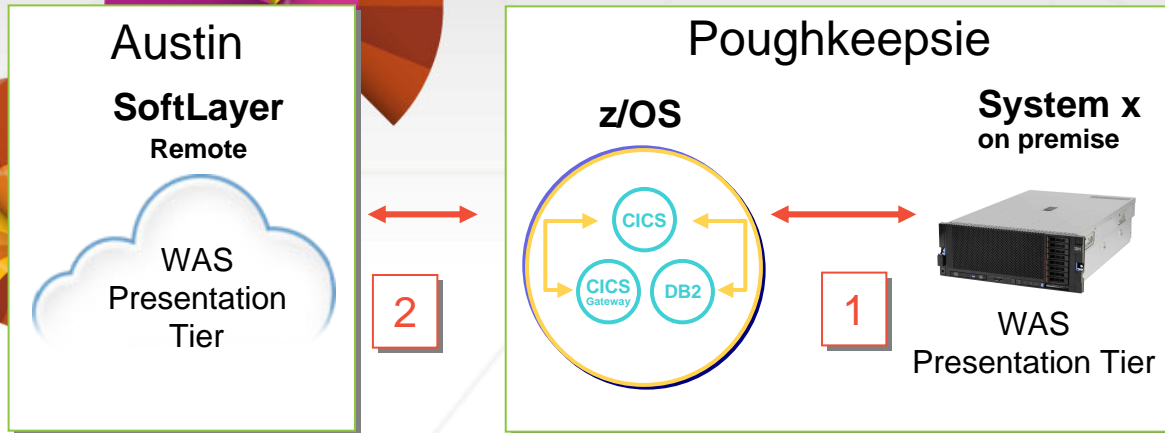
Hybrid cloud
Maximum flexibility through use of on- and off-premise resources

Linux on z cloud
Highly efficient fully virtualized infrastructure

On premise and off premise: System z delivers the performance you need



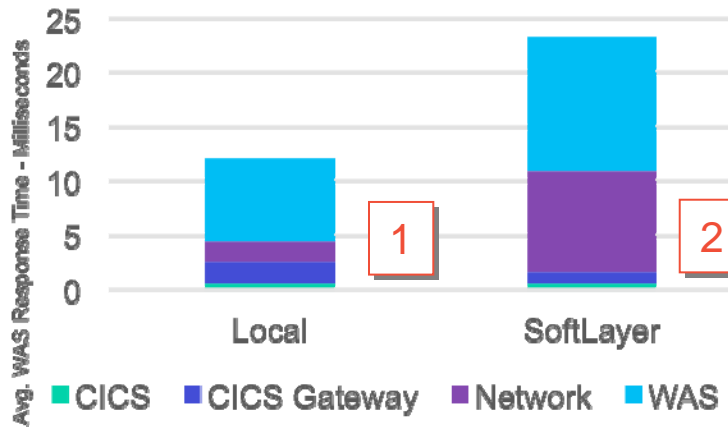
System z and SoftLayer Study



Results

- No surprises or issues in implementing the Hybrid architecture
- No major performance impacts from added security
- Relatively small performance impact accessing z/OS from SoftLayer

Latency – On-premise vs. SoftLayer



- 15ms increase in network latency for each CICS call
- 11ms increase in average transaction response time
- No significant change in transaction rate or z/OS load



Tackling HIV in Ghana

A technology-intensive project to eliminate mother-to-child transmission of HIV in the African nation using the mainframe to capture, store, and retrieve data from clinics, offices and remote sites



Plans to cut transmission to

< 5% y 2018



The future of next-generation mainframe systems

Cognitive systems

Atomic level storage

Neurosynaptic chip

Optical circuits

Hybrid computing 2.0

Greater parallelism

Hybrid clouds

Natural intuitive interfaces

Advanced, open KVM virtualization

Self check-pointing and invisible failover

Tamper-proof processing

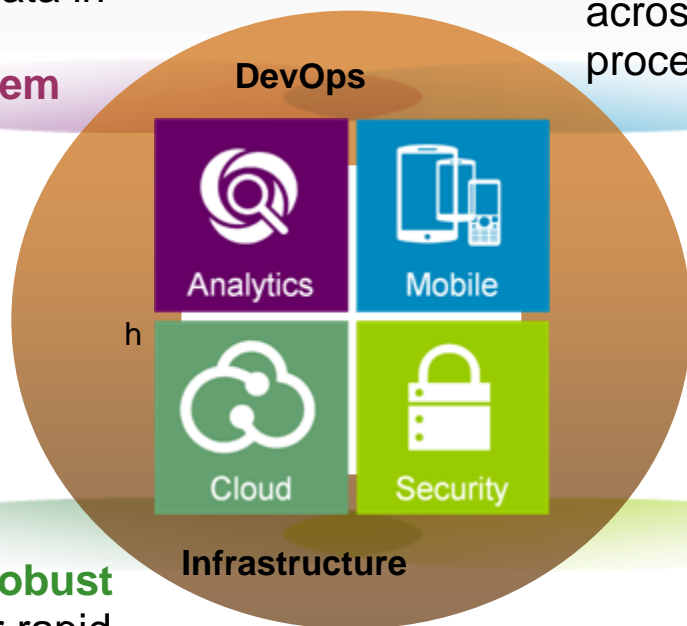




Create a competitive advantage in the digital era

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

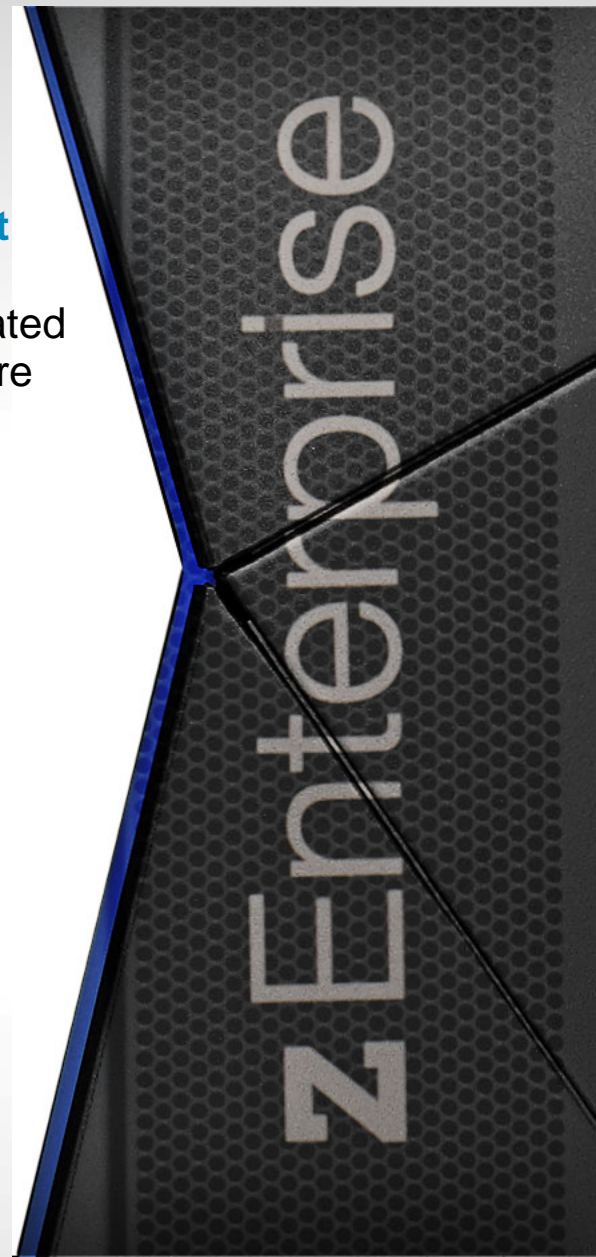
Creating **Intelligent interaction** in transactions integrated across mobile & core processes



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!!!





Thank You



z/OS V2.1 quick reference

Messages

Value

z/OS® V2.1 Enhancements

Which Companies Benefit?

Data and Analytics Ready



Customers can manage significantly more data for less
Customers can process active content at scale

- Compression zEDC
- SMC-R (RoCE)
- VSAM RLS enhancements
- Batch enhancements
- Fonts

- Companies who need to securely process huge volumes of data.
- Companies who need to analyze more active data, move data efficiently and quickly.

Cloud Ready



Drive higher throughput, remarkable availability, and scale like no other system

- 2GB pages
- Flash Express
- Transactional Execution
- 100 way SMP
- RMF enhancements

- Companies with advanced, or complex workloads requiring extreme availability resiliency and scale.
- Companies who need to connect private clouds with back end systems and data

Security Ready



Secure your infrastructure, protect assets and data, leverage crypto as a service
Audit and comply with regulations.

- Crypto as a service
- New health checks
- PKCS #11 and EMV standards
- Improved auditing, compliance
- Designed for EAL 5+

- Service Providers, Telcos, Banks, or any company who needs highly secured data with centralized policy based management
- Companies that need to comply with regulations and improve audit readiness

Mobile Ready



Extend mainframe application data securely to mobile devices

- CICS® JSON interfaces
- Worklight® for delivery to devices
- Workload isolation
- Secured , high speed communications

- Customers with systems of record requiring mobile access to secured content and enforced isolation of workloads



System z Unique Characteristics to support Mobile Applications



- Easy-to-consume APIs from CICS, DB2, IMS allow you to leverage your investment in z/OS transactions to quickly add a mobile channel.
- z/OS enables massive and simple scalability in a single footprint, to handle the workload of millions of devices and sensors
- Worklight security integrates with z/OS security providing end-to-end security and data privacy for mobile apps.
- z/OS Workload Management ensures your crucial applications remain responsive during sharp spikes in demand.
- **Low-latency I/O.** Mobile usage patterns favor short, read-only data requests (Users check account balances) So fast access to operational data, with low latency, is key. The mainframe offers exceptional I/O with dedicated hardware I/O processors. This reduces latency, which increases mobile app response times.
- **Business Resiliency** for critical mobile apps

Infrastructure matters for mobile applications. The System z platform's scalability, security, and resilience can enhance critical mobile applications.





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

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



zEnterprise wins Tech Innovator Award for Cloud Solutions



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*

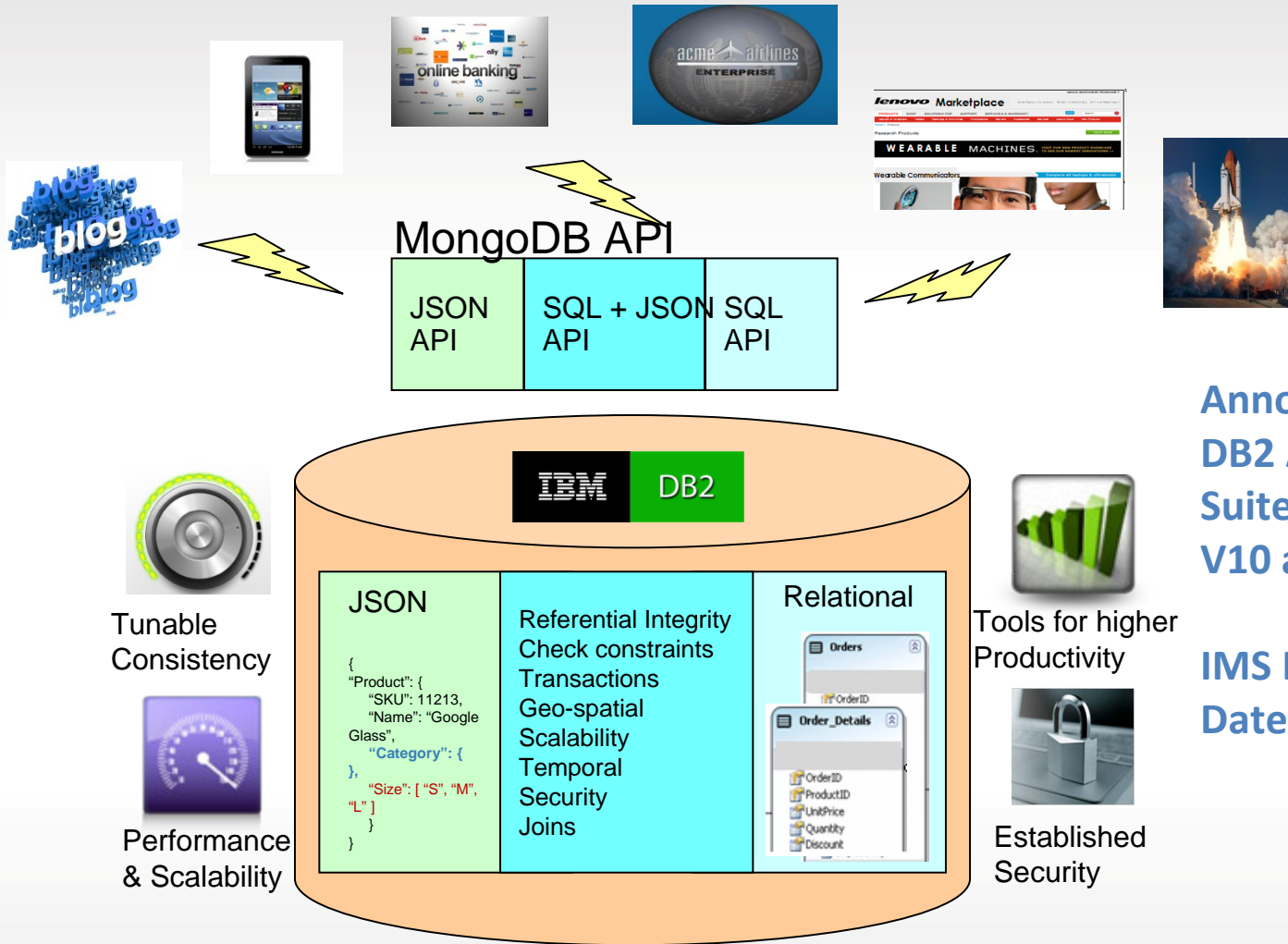


Nationwide[®]

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

JSON Database Technology

Providing the best of both worlds



Announced in
DB2 Accessories
Suite for z/OS,
V10 and V11

IMS In Plan
Date TBD