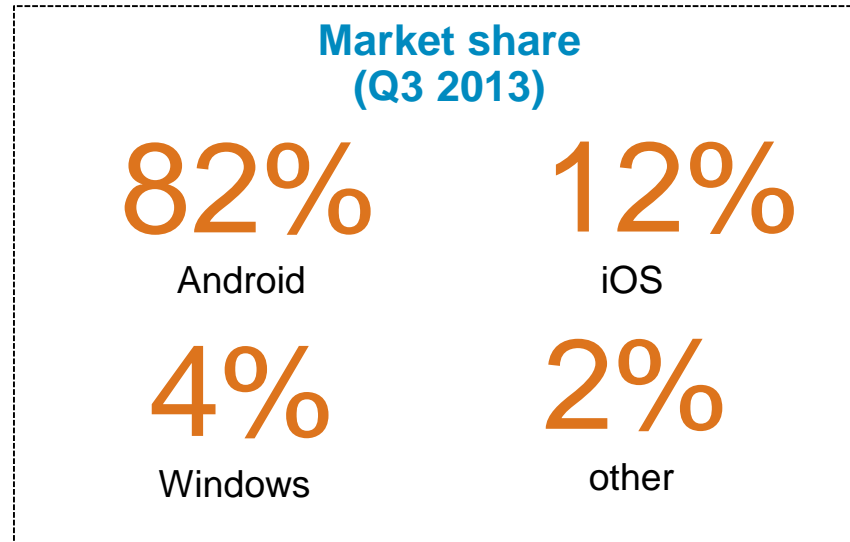# The Gold Standard
for Enterprise Computing

Is Your Enterprise Ready
for the Mobile Revolution?

How many of you have: iPhones? Samsung Galaxy? Windows phones? other?

Brazil, Russia, India, China and Indonesia are expected to be the fast-growth smartphone markets over the next few years
(Source: IDC, Canalys)

7.3%

Drop in average selling price from 2013 to 2017

Market share (Q3 2013)

82% Android	**12%** iOS
4% Windows	**2%** other

04. Is your enterprise ready for the mobile revolution?

How many of you have ever used your smart device to do the following:

- Browsed a company web site, and made a purchase?
- Deposited a check to your banking account, or made a payment from your bank account?
- Check traffic or other conditions at a local town government site?
- Managed your personal finances (e.g., bought and sold stocks)?

18M
people use mobile devices for bank transactions – that's 8% of all bank transactions

25% of all online travel searches come from a mobile device

67%
of global consumers want to use mobile devices for checkout and service

Mobile banking transactions grew at
138% from 2008-2012

1/3 of citizens access federal government website by logging in from phones or tablets

Source: IBM; Digital Front Office Institute for Business Value Study.

Mobile business truly will be HUGE – just look at the numbers!

Time Magazine, January 2014
Projections of mobile growth and PC decline based on Gartner data
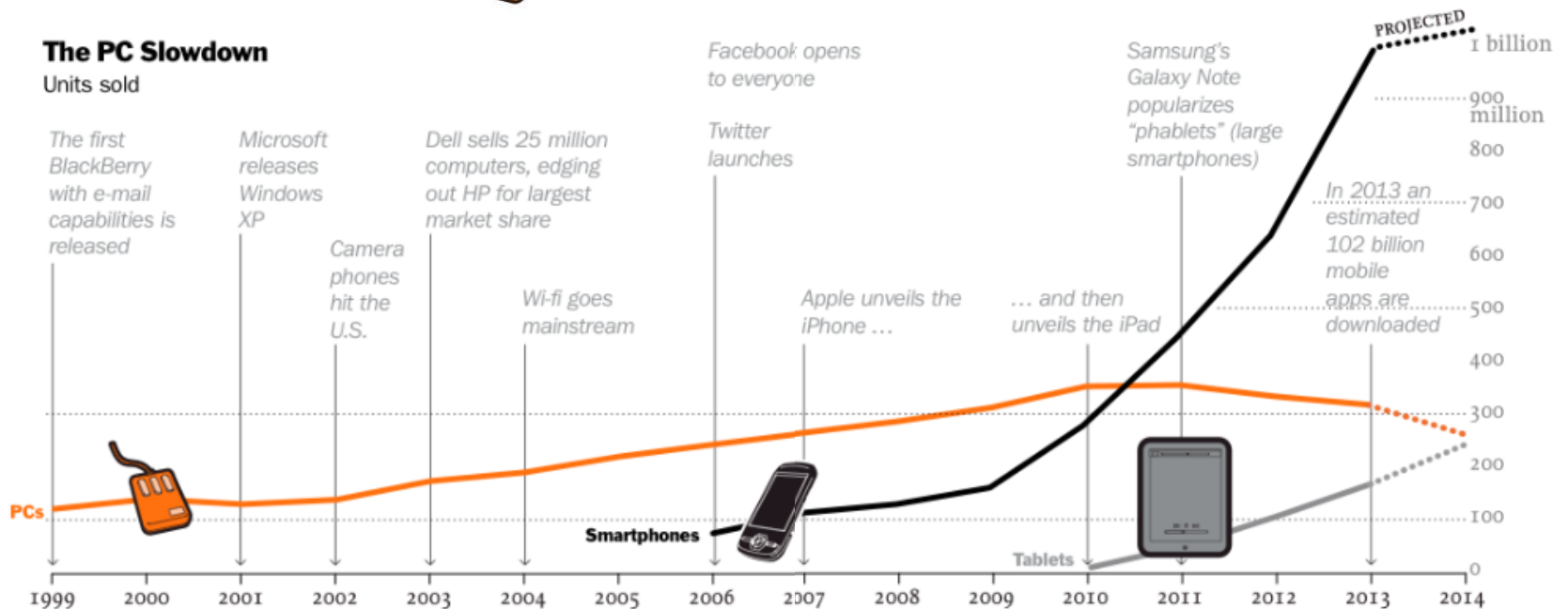
The Death Of the PC?

Now that we carry computers in our pockets, desktops and laptops are on the decline

SMALLER DEVICES WILL TAKE OVER

1.2B
(NOTE: World population is about 7.1B)

The PC Slowdown
Units sold

The first BlackBerry with e-mail capabilities is released

Microsoft releases Windows XP

Camera phones hit the U.S.

Dell sells 25 million computers, edging out HP for largest market share

Wi-fi goes mainstream

Twitter launches

Apple unveils the iPhone …

Facebook opens to everyone

… and then unveils the iPad

Samsung's Galaxy Note popularizes "phablets" (large smartphones)

In 2013 an estimated 102 billion mobile apps are downloaded

PROJECTED

1 billion
900 million
800
700
600
500
400
300
200
100
0

PCs
Smartphones
Tablets

1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014

SOURCE: GARTNER, DECEMBER 2013

04. New and Existing Workloads.pptx

A mobile strategy is critically important to business

- Enables premium customer service

- Broadens market reach

- Increases revenue

- Increases operational efficiency

Mobile/Wireless/Cloud

Web/Desktop

Client/Server

Mobile is a significant component in the evolution of computing

04. Is your enterprise ready for the mobile revolution?

But the mobile revolution will put huge demands on business and IT – *are you ready?*

- Inconsistent peaks 24/7 will be common

- Increased system load

- New versions of apps occurring weekly vs. yearly

- Development, control and support of apps and multiple devices will not be standard

- Security and privacy must be paramount

To become a successful mobile enterprise, there are three things to understand

1. ## The magnitude of the mobile revolution will overshadow the eBusiness revolution

   - Anticipate huge numbers of transactions, with potentially wildly varying fluctuations in numbers
   - Exceptional levels of scalability and elasticity will be required
   - Optimizations through hardware and software must be cost effective

2. ## Every transaction must be immediate, authentic and secure

   - Centralize content and information management
   - Ensure highest levels of protection and privacy
   - Use a rock-solid infrastructure – reliable, consistent, sustainable

3. ## Extending business workloads to mobile devices has to be easy

   - Optimize development and delivery
   - Support a unified platform and open technologies

zEnterprise is uniquely positioned to be the centerpiece of a mobile enterprise

Only zEnterprise can efficiently and reliably support the magnitude of transactions

zEnterprise is the data and security "hub" of today's enterprise businesses

zEnterprise includes integrated, open tools for easy development of mobile apps for business

04. Is your enterprise ready for the mobile revolution?

Only zEnterprise can efficiently and reliably support the *magnitude* of transactions anticipated with the mobile revolution

- Support for huge transaction rates

- Perfect workload management

- Massive scalability

- Capacity on demand

- Workload optimization to improve cost effectiveness

Massive processing power and transaction server innovation drives very high transaction rates required by mobile business

The IMS Performance Team celebrates a remarkable achievement:

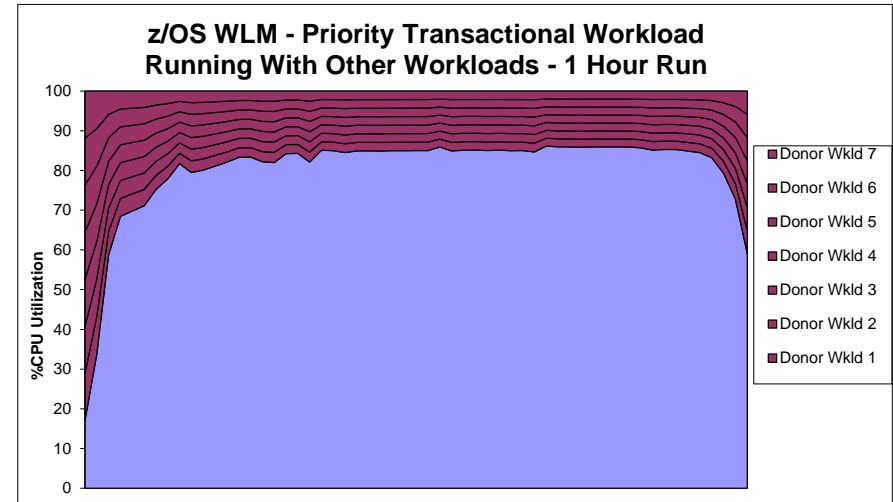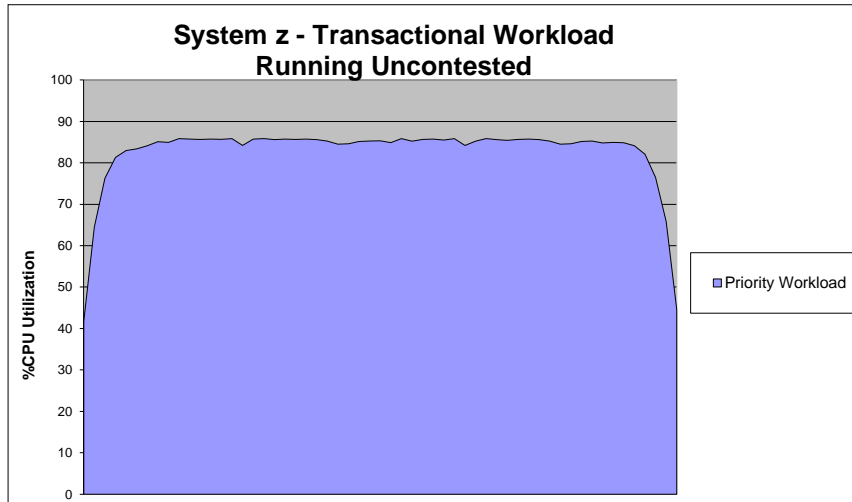A single IMS Fast Path system was benchmarked at over 100,000 transactions per second (TPS), sustained.

- August 2013. IBM Silicon Valley Lab, San Jose, California

"Typically, we now process around **100 million transactions** each day, but during this year's Easter holiday, online shopping events pushed our daily transactions to a **peak of 128 million**—an increase of more than 10 percent... IBM CICS is of paramount importance to most of our clients."

- Jan Brandvold, EVRY

Source: IBM

z/OS Workload Manager (WLM) insures perfect workload management for mobile and other workloads

System z - Transactional Workload Running Uncontested

%CPU Utilization

- Priority Workload

z/OS WLM - Priority Transactional Workload Running With Other Workloads - 1 Hour Run

%CPU Utilization

- Donor Wkld 7
- Donor Wkld 6
- Donor Wkld 5
- Donor Wkld 4
- Donor Wkld 3
- Donor Wkld 2
- Donor Wkld 1

Capacity Used
High Priority Steady State - 85.2% CPU Minutes
Unused (wasted) - 14.8% CPU Minutes

Capacity Used
High Priority Steady State - 85.3% CPU Minutes
Unused (wasted) - 0% CPU Minutes

Priority Workload Metrics
Total Throughput: 417.8K
Maximum TPS 129.7

Priority Workload Metrics
Total Throughput: 414.7K
Maximum TPS 128.1

NO steady state CPU usage leakage *1%* total transaction leakage

Source: IBM CPO

z/OS WLM efficiently balances CICS and IMS workloads to support unpredictable mobile-generated demand

- CICS and IMS integrate tightly with z/OS Workload Manager

- WLM manages CICS or IMS workloads in either of two ways:

Each workload is given a percentage of total execution time (a.k.a. velocity goal)

Workloads are each given enough execution time to meet specific transaction rate goals

Address space management

Server management

WLM makes sure priority workloads, mobile or not, meet their goals – regardless of other executing workloads

DEMO: Perfect workload management for mobile workloads

13
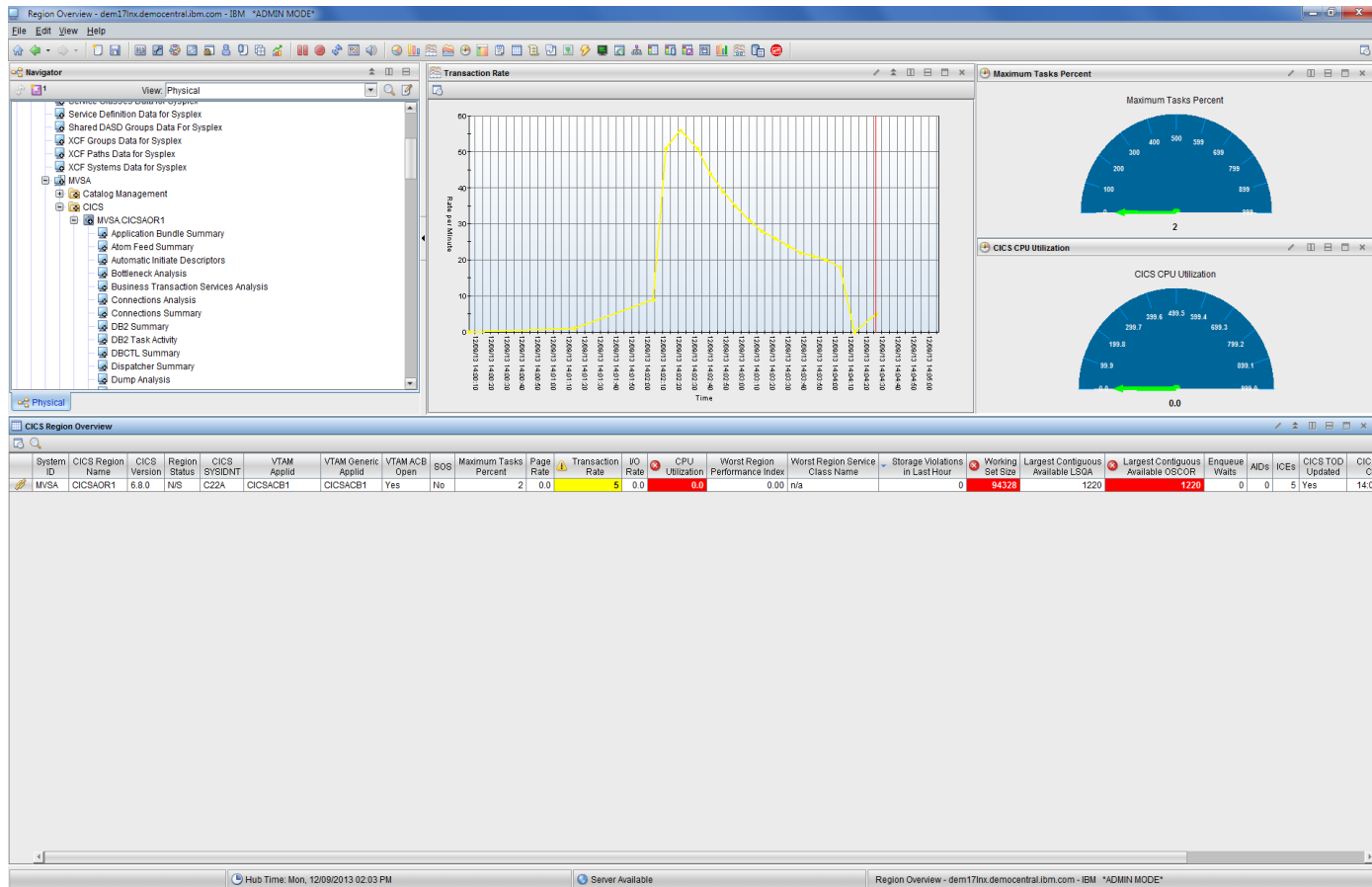
zEnterprise handles mobile's unpredictable peaks with data sharing and parallel sysplex

System
Utilization
50%

CF

System
Utilization
90%

CF

System
Utilization
80%
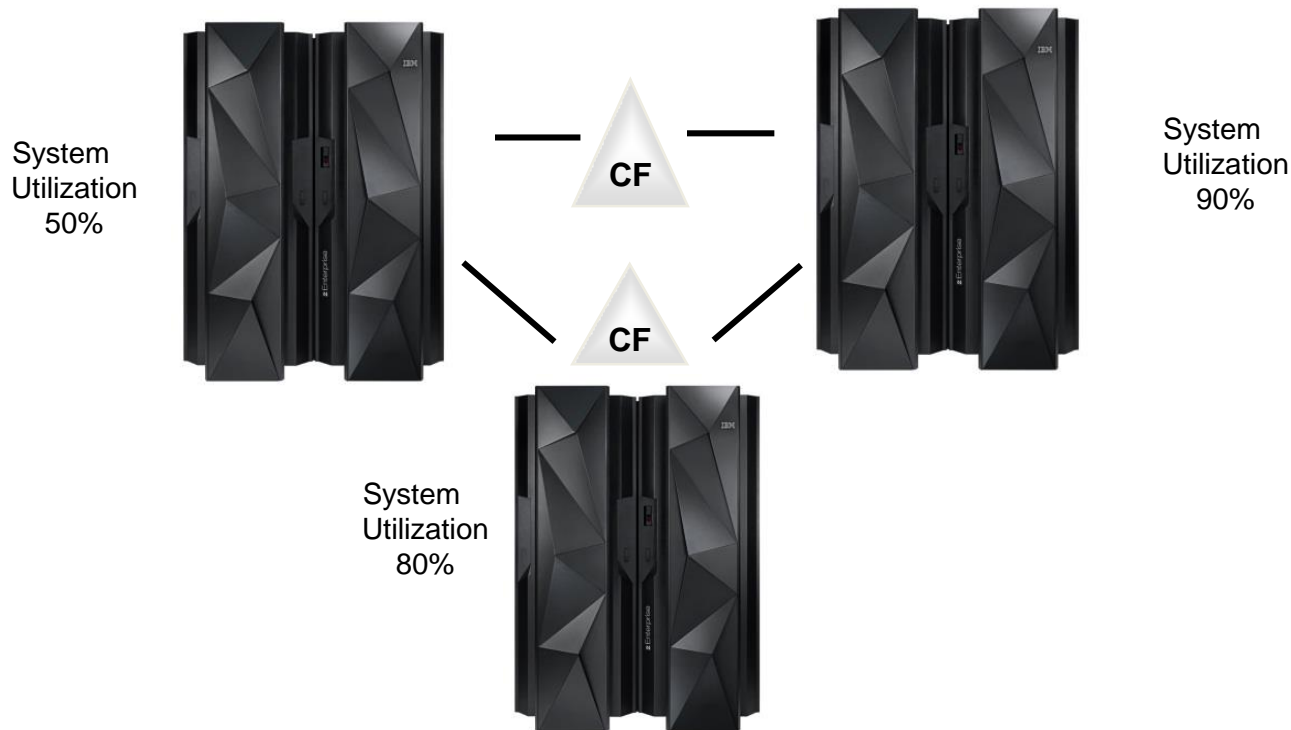
- Servers supporting mobile applications can run in a "virtual" single system
- Mobile transactions are routed to the system best able to handle the peak
- All resources are shared through the Coupling Facility (CF)
- Net result is maximized CPU utilization across several separate physical systems

04. Is your enterprise ready for the mobile revolution?

Add physical processors when needed to handle unexpected peaks

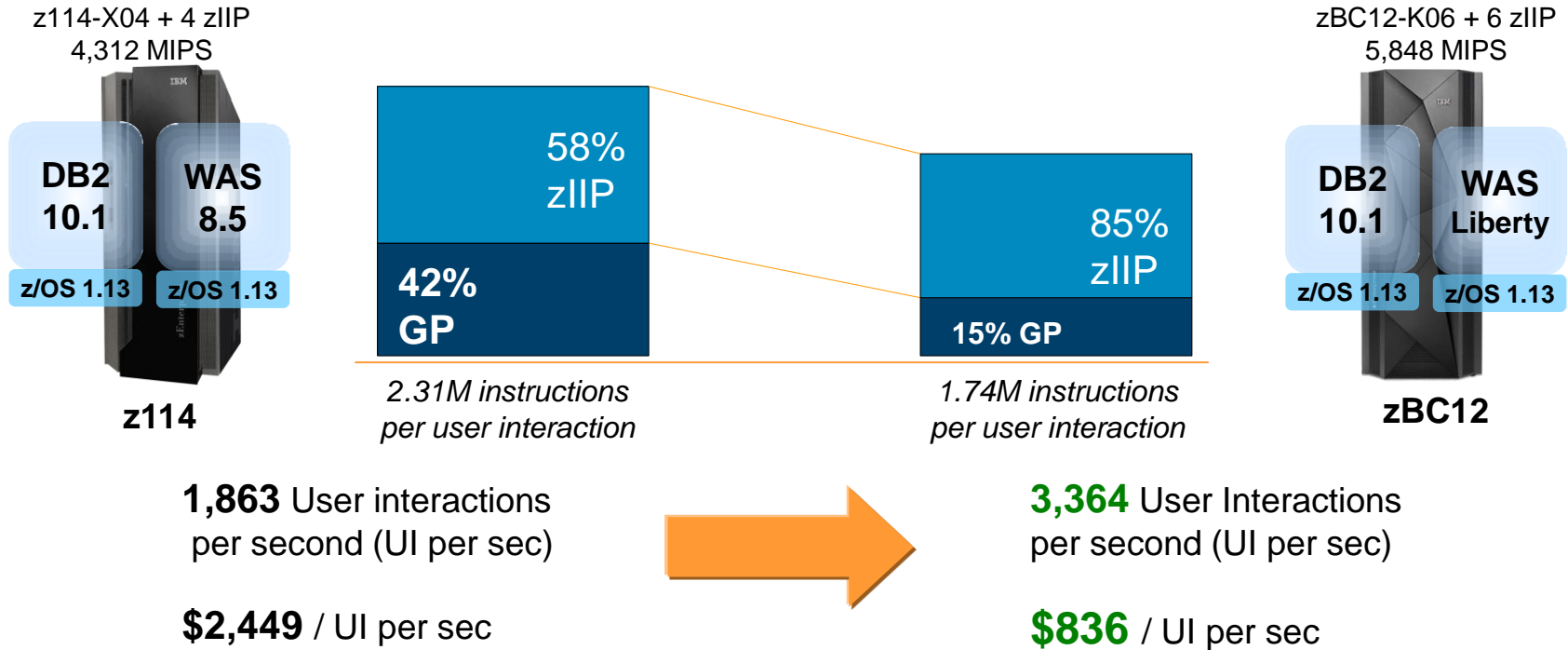**One zEC12 book with 36 processors**

- Capacity on Demand
  - "Books" are shipped fully populated
  - Activate dormant processors as needed
  - Use for temporary or permanent capacity
  - Self-managed on/off

- New capacity is immediately available for work without service disruption
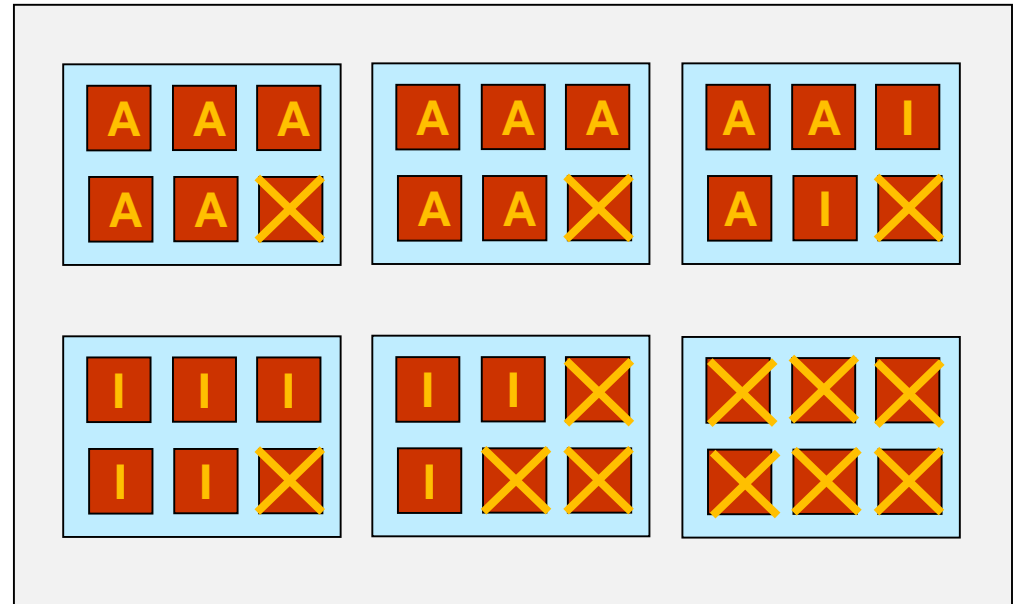
A Active processors (13) – pay standard price

I Inactive processors (10) – pay only 2% of full price

X Dark processors (13) – no charge

Workload optimization through hardware and software upgrades can reduce costs for mobile workloads

z114-X04 + 4 zIIP
4,312 MIPS

DB2 10.1   **WAS 8.5**

z/OS 1.13   z/OS 1.13

z114

| 58% zIIP |
| 42% GP |

2.31M instructions per user interaction

| 85% zIIP |
| 15% GP |

1.74M instructions per user interaction

zBC12-K06 + 6 zIIP
5,848 MIPS

DB2 10.1   **WAS Liberty**

z/OS 1.13   z/OS 1.13

zBC12

1,863 User interactions per second (UI per sec)

3,364 User Interactions per second (UI per sec)

$2,449 / UI per sec

$836 / UI per sec

- **Latest generation of specialty processors support more workload**
- **Latest release of WAS (Liberty profile) uses specialty engines more efficiently, drives higher overall transaction rate**

* Friendly Bank Java workload on WAS. z114 and zBC12 UI per sec results projected from actual measurements on z196 and zEC12 respectively.

IBM®

Where is the business data located? Where are the commerce engines that drive business?

60-70% of operational business data resides on System z

CICS
DB2
IMS
...

z/OS

Operational Data
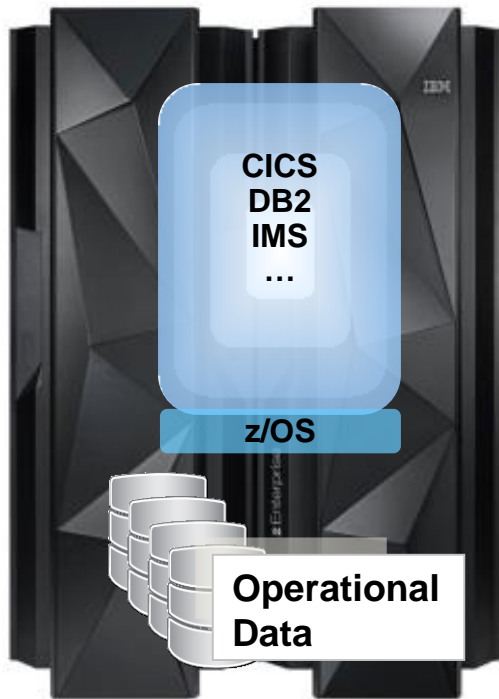
85%
of business transactions are processed on a mainframe
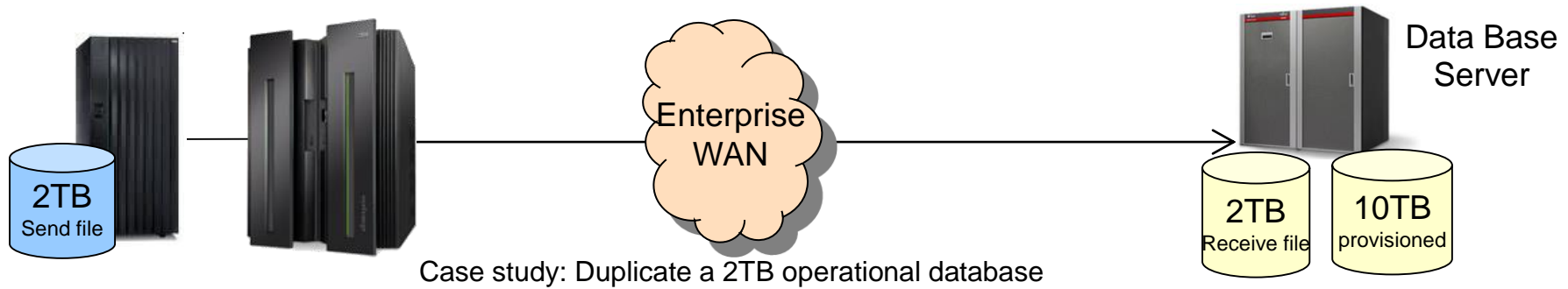
70%
of top 500 System z customers run CICS

23 of top 25
US retailers use System z

70 of top 75
world's banks use System z

Source IBM and IBM Systems Magazine

Significant costs (often hidden) are involved when moving data off the mainframe

Data Base Server

2TB
Send file

Enterprise WAN

2TB
Receive file

10TB
provisioned

Case study: Duplicate a 2TB operational database

Cost of storage - send file $12.33/GB x 2048 GB	$25K

Storage acquisition cost
$0.2M

Cost of storage - receive file $18/GB x 2048 GB	$37K
Cost of storage - data mart $18/GB x 10,240 GB	$184K

System z Storage Admin $5.88/GB/yr x 2048 GB	$12K

Annual storage admin cost
$0.1M

Distributed Storage Admin $8.99/GB/yr x 12,288 GB	$110K

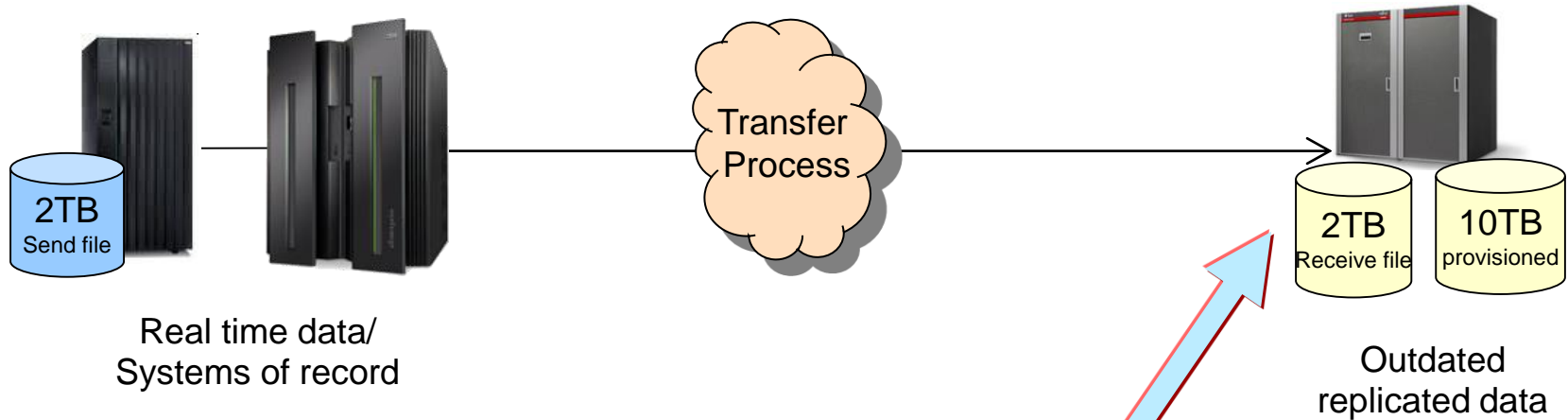|	
System z CPU extract $1.38/GB x 2048 GB x 365	$1.03M
System z CPU cost FTP $0.58/GB x 2048 GB x 365	$434K
System z extract labor $9.33/job x 365	$3.3K
System z FTP labor $5.88/job x 365	$2.2K

On Premises Network $0.0024/GB x 2048 GB x 4 hops x 365	$7.1K
Off Premises Network $0.29/GB x 2048 GB x 2 hops x 365	$434K

Annual Transfer Costs
$2.2M

Distributed CPU cost load $0.39/GB x 2048 GB x 365	$292K
Distributed CPU cost FTP $0.05/GB x 2048 GB x 365	$35K
Distributed load labor $14.00/job x 365	$5.1K

Database analysis costs not included
Based on IBM internal study

When data is duplicated, you no longer have a "single version of the truth"

2TB
Send file

Real time data/
Systems of record

Transfer
Process

2TB
Receive file

10TB
provisioned

Outdated
replicated data

Mobile customers will not tolerate operating against old, unauthentic data!

04. Is your enterprise ready for the mobile revolution?

Example: Consider the typical business traveler today…

Electronic boarding pass
Traveler views boarding pass prior to leaving, at the airport, and at boarding

Seat Selection Update
Traveler views current seat, potential upgrades, capacity of plane

Flight status real time
Traveler views potential flight delays, airport information, connecting flights, and notifications pushed to device

All information on the mobile device is connected to the back end and *consistent* *with what airline personnel see. Updating an "offline" data source is unacceptable*

04. Is your enterprise ready for the mobile revolution?

Solution: Keep the data on the mainframe, and bring the mobile applications to the data

The users are here…

Business-critical applications and data are here…
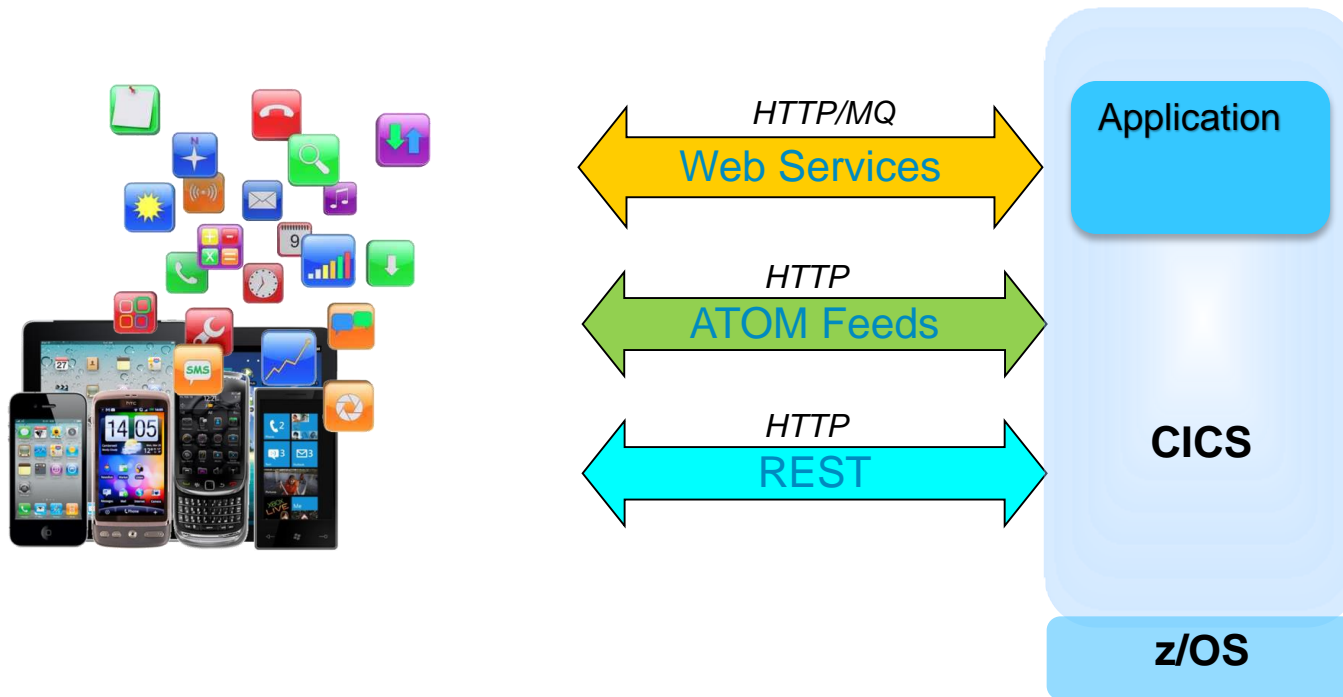

**CICS
DB2
IMS
…**

z/OS

**Operational
Data**

- *Remove data duplication costs*
- *Insure customers have authentic data*

04. Is your enterprise ready for the mobile revolution?

CICS supports a number of connectivity options to mobile-enable applications

- CICS supplies necessary tools and runtime for SOAP Web Services binding, language structures and XML (available since CICS TS 3.1)

- ATOM support allows for CICS data injection into business mashups and situational applications (available since CICS TS 4.1)

- COBOL, C/C++, PL/I and Java programs can be RESTful service providers

FNB (South Africa) – Extending traditional banking workloads to support today's new technologies

Committed to IMS – it's strategic to their business, and will be for next 20 years!

- Business challenge:
  - Shift to self-service mobile banking
  - Improve customer satisfaction and add new revenue

- Solution:
  - Implemented a SOAP-based channel architecture around core z/OS IMS applications
  - Tuned performance and improved response time
  - Simplified overall architecture around IMS applications

- Benefits:
  - IMS workload growth up to 8x in 10 years, and 920M transactions a month
  - Customer-initiated transactions workload – including mobile – has doubled every year for 6 years
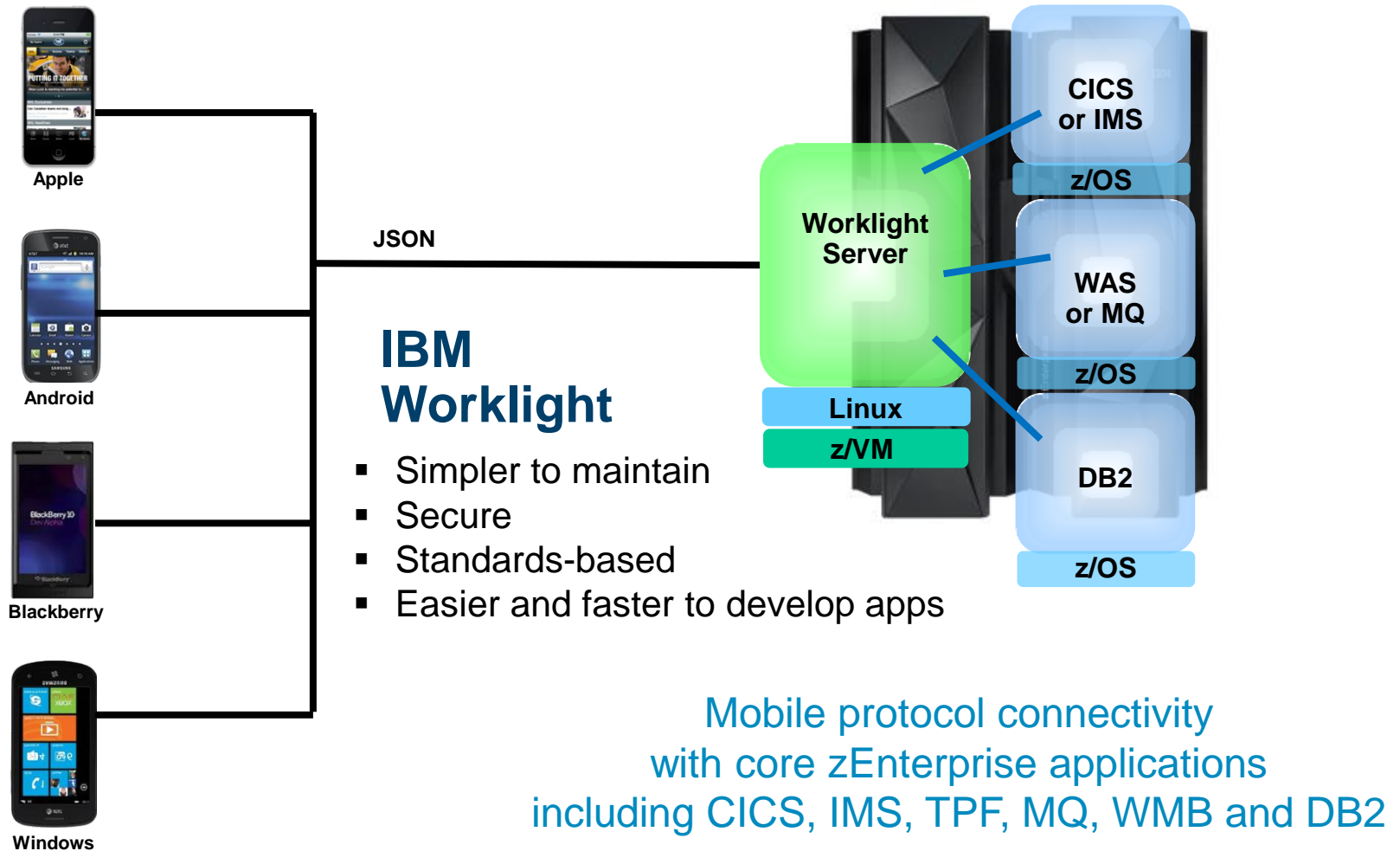
"Innovation and technology are core to FNB business strategy. We achieved our goals with IMS as our core strategic transactional system providing both transactional and batch workload support, capability to scale in both transactional and database volumes, cloud-like concepts, and 24x7 service capability."
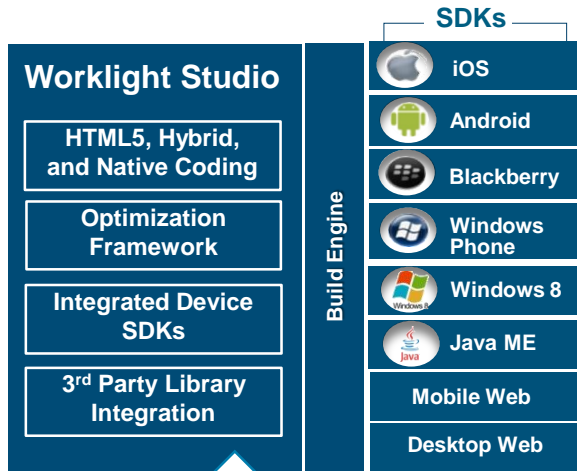
— Jay Prag, FNB of South Africa

Centralized server technology provides a platform to manage and drive all mobile applications

Apple

Android

Blackberry

Windows

JSON

IBM Worklight

- Simpler to maintain
- Secure
- Standards-based
- Easier and faster to develop apps

Worklight Server

Linux

z/VM

CICS or IMS

z/OS

WAS or MQ

z/OS

DB2

z/OS

Mobile protocol connectivity
with core zEnterprise applications
including CICS, IMS, TPF, MQ, WMB and DB2

A centralized strategy for mobile services has its advantages

- Worklight Server
  - Components and adapters for channeling zEnterprise applications to mobile devices
  - Manages caching, data synchronization and end-to-end encryption
  - Transforms enterprise data into mobile-friendly, JSON format

04. Is your enterprise ready for the mobile revolution?
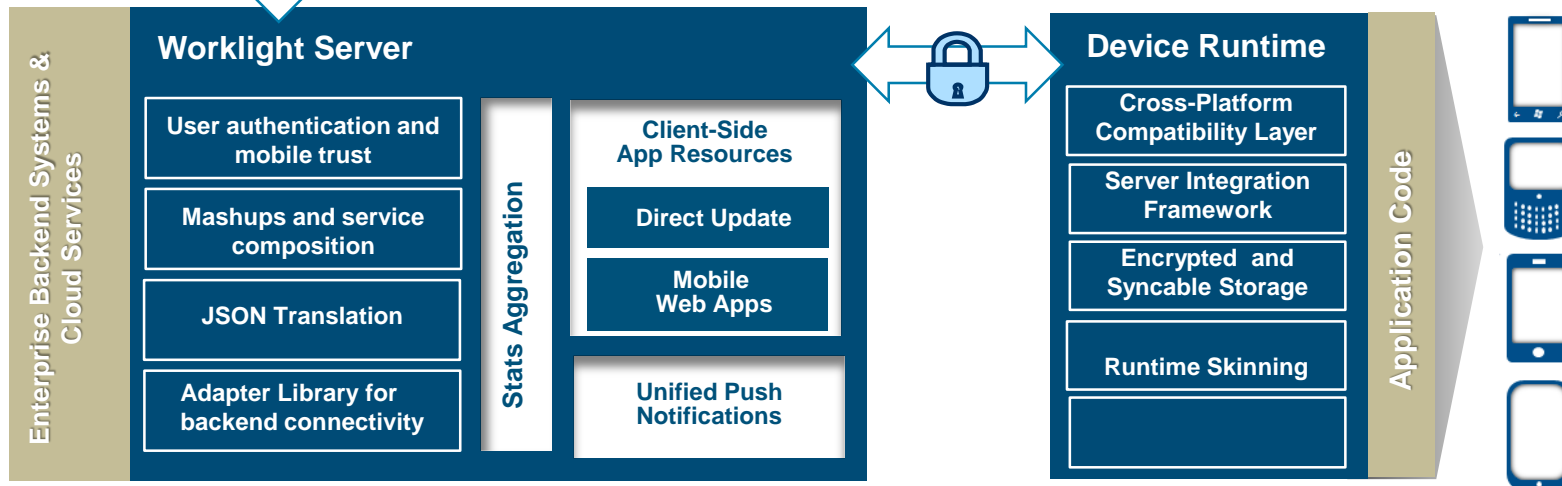
Worklight uses a lightweight, human-readable text-based format for data

JSON – JavaScript Object Notation

- Native JavaScript support – easy for app developers
- Simple structure – an alternative to XML – ideal for mobile transfers
- Lightweight – uses less meta-data
- Widely adopted by the industry – the mobile format of choice

```
var personObject = {
    "name":"John Johnson",
    "street":"Oslo West 555",
    "age":33,
    "phone":"555 1234567"
};
var personAge = personObject.age;
```
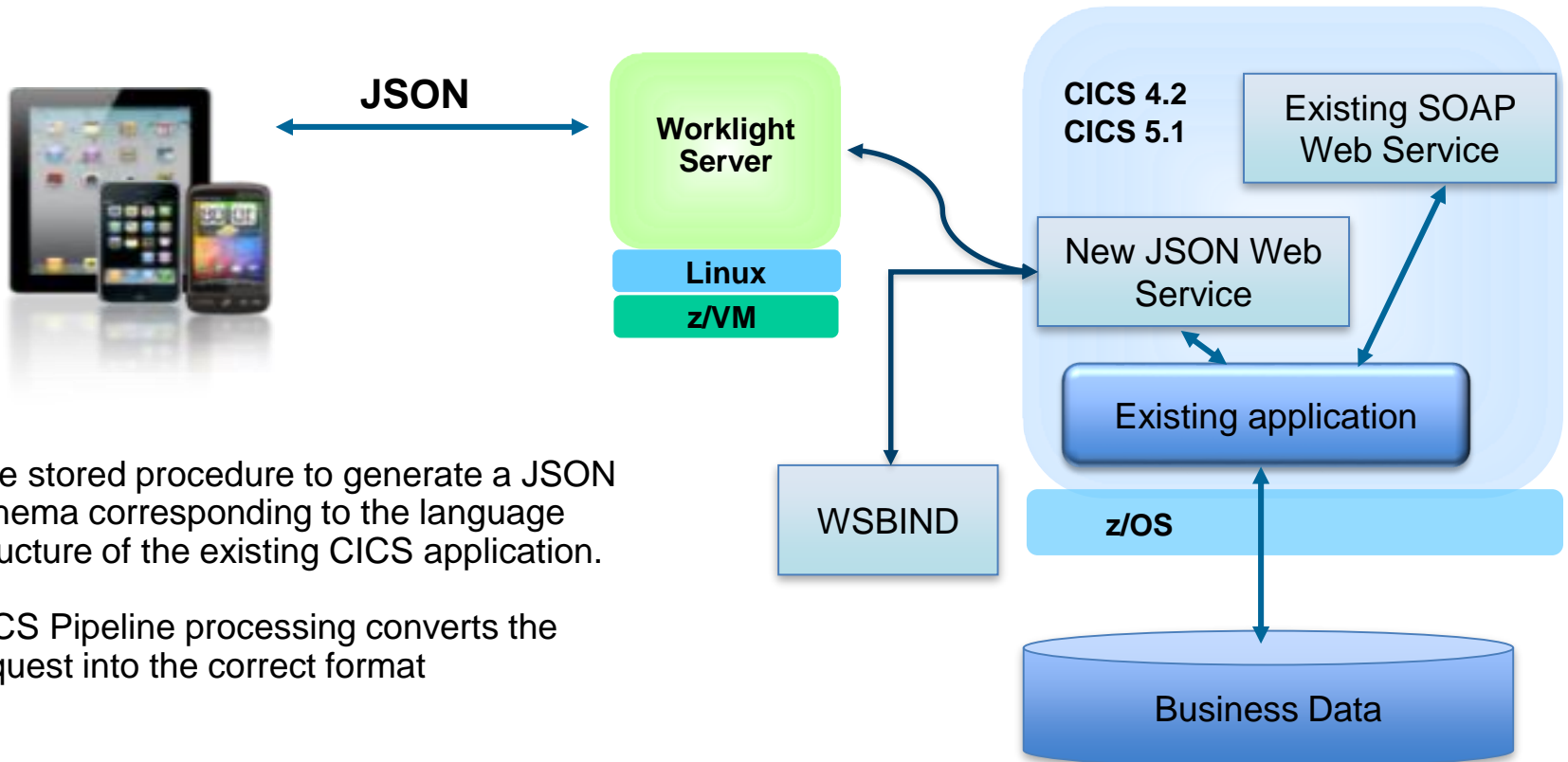
Name-value pair structure

Simple data access

JSON interface binds CICS applications to Worklight Server

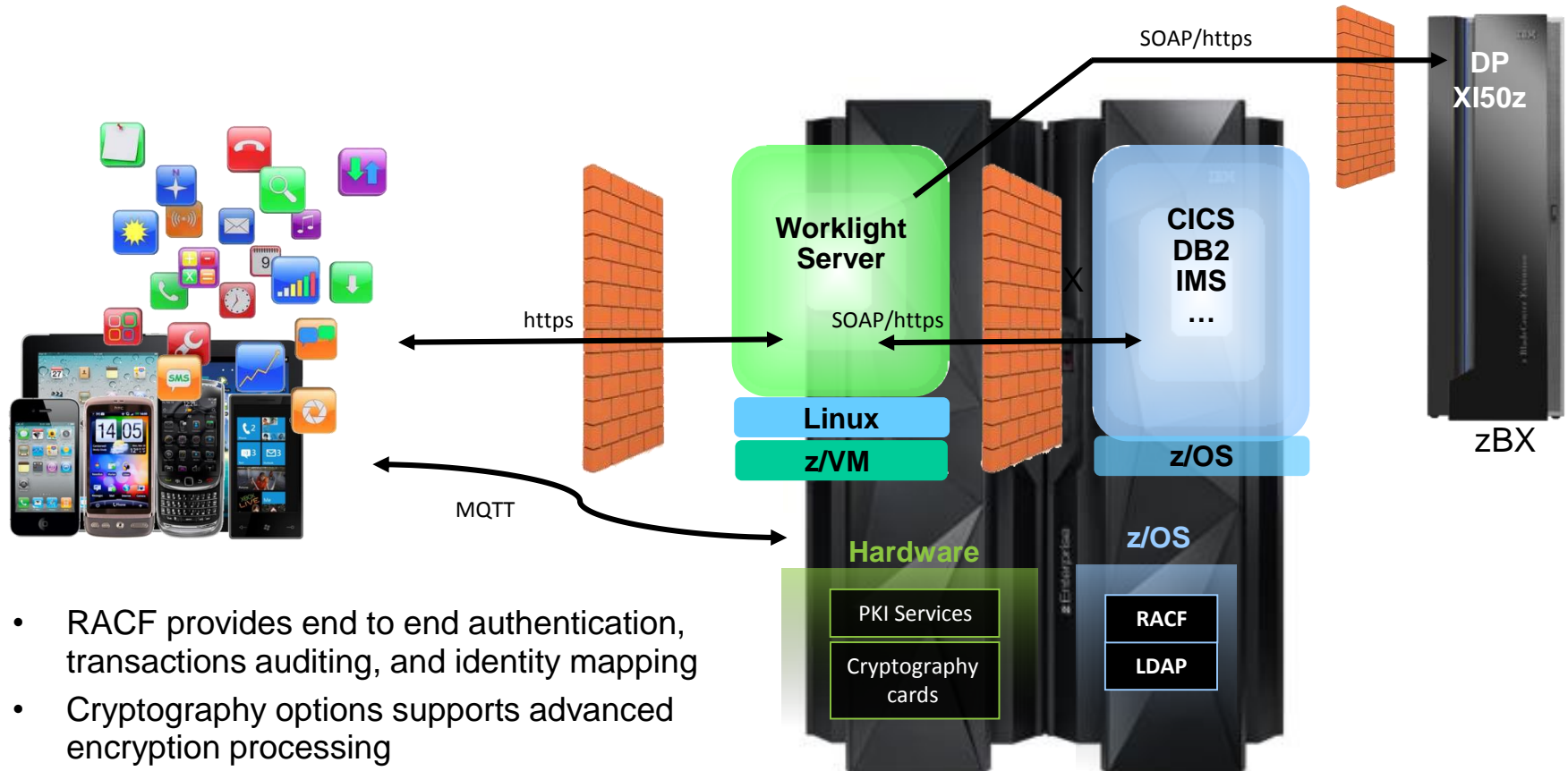Exposing an existing CICS application as a **JSON** callable service:

Existing SOAP Web Services remain unaffected by the introduction of new mobile based clients

JSON

Worklight Server

Linux

z/VM

CICS 4.2
CICS 5.1

Existing SOAP Web Service

New JSON Web Service

Existing application

WSBIND

z/OS

Business Data

Use stored procedure to generate a JSON schema corresponding to the language structure of the existing CICS application.
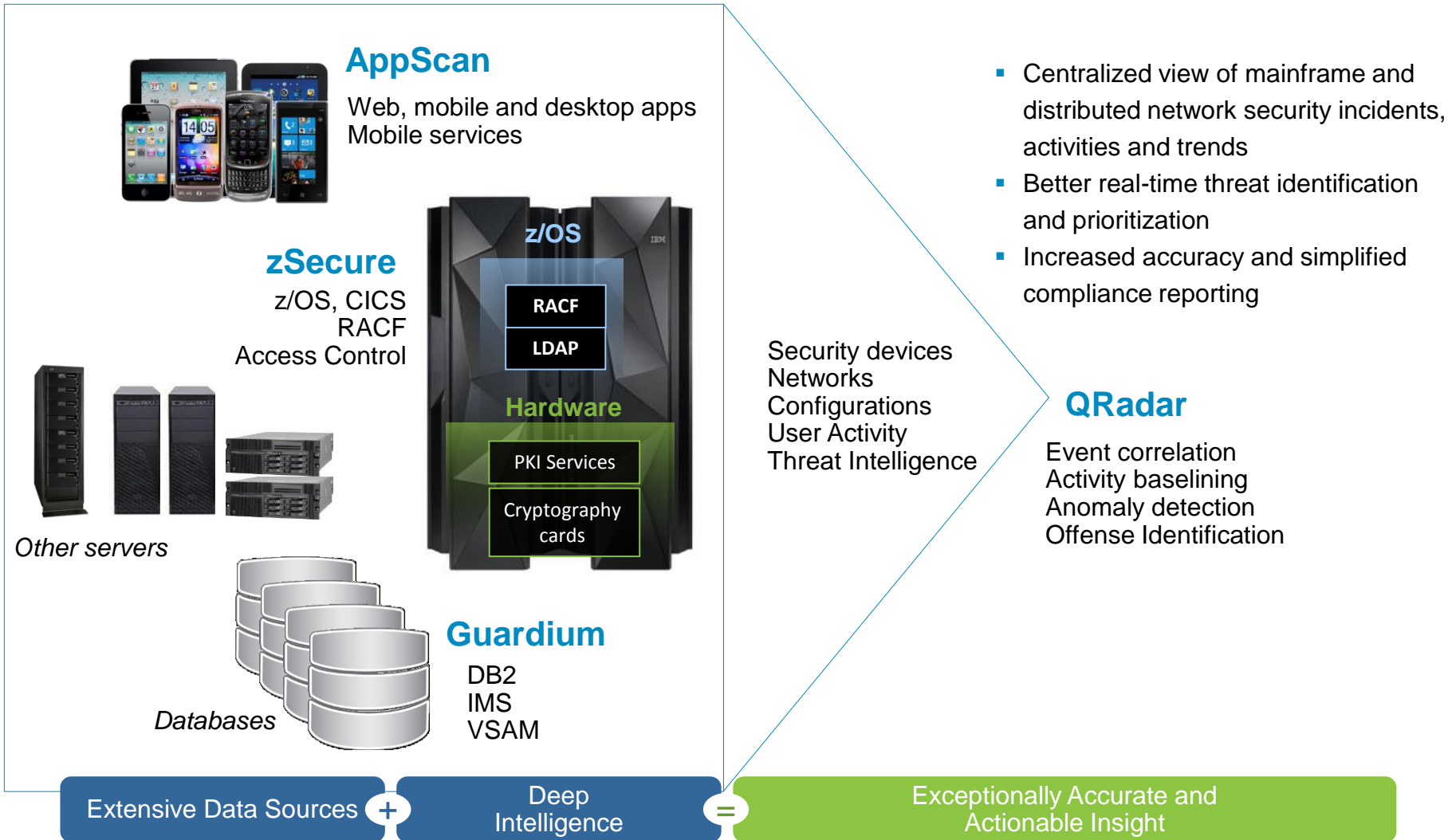
CICS Pipeline processing converts the request into the correct format

CICS TS Feature Pack for Mobile Extensions enables easy creation of mobile apps for CICS

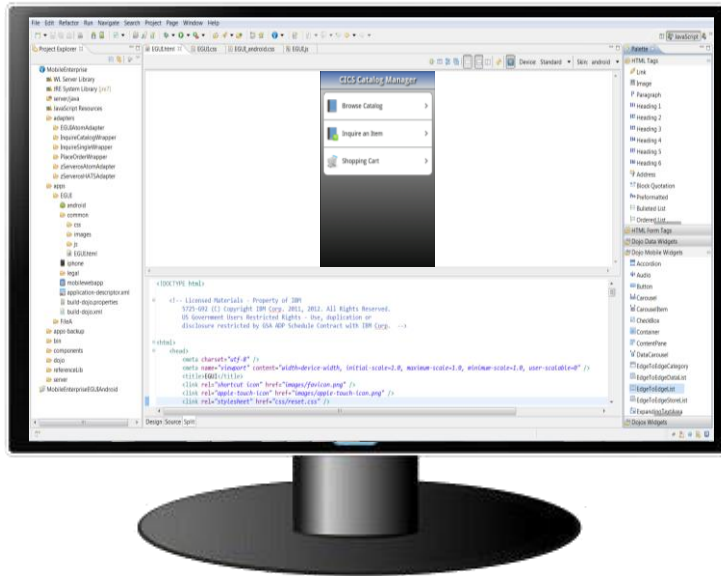# End to end security from mobile to the mainframe and back

- RACF provides end to end authentication, transactions auditing, and identity mapping
- Cryptography options supports advanced encryption processing
- PKI services centrally manage certificates
- DataPower XI50z (in zBX) provides secure integration gateway, centralized key management and mobile access policies
- High level security connection to backend applications via hipersockets or IEDN

04. Is your enterprise ready for the mobile revolution?

New vulnerabilities in the mobile age call for extending security monitoring and intelligence throughout the data center

AppScan

Web, mobile and desktop apps
Mobile services

zSecure

z/OS, CICS
RACF
Access Control

Other servers

z/OS

RACF

LDAP

Hardware

PKI Services

Cryptography cards

Guardium

DB2
IMS
VSAM

Databases

Security devices
Networks
Configurations
User Activity
Threat Intelligence

- Centralized view of mainframe and distributed network security incidents, activities and trends
- Better real-time threat identification and prioritization
- Increased accuracy and simplified compliance reporting

QRadar

Event correlation
Activity baselining
Anomaly detection
Offense Identification

Extensive Data Sources **+** Deep Intelligence **=** Exceptionally Accurate and Actionable Insight

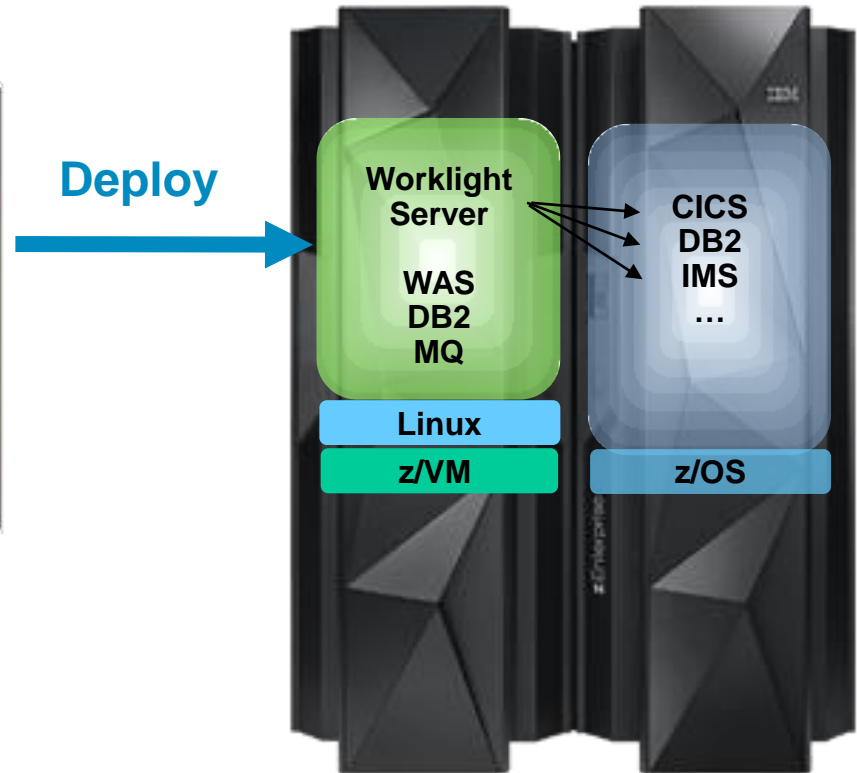04. Is your enterprise ready for the mobile revolution?

DEMO: Easily and quickly extend mainframe-based business applications to mobile users

Develop

IBM Worklight Studio

Deploy

- **Worklight Studio** includes tools for mobile application development, with programming models and web support
- Fully integrated into the RDz Eclipse-based platform

Major international retailer goes mobile with CICS and System z

IBM Worklight enables mobile access to an existing CICS warehouse application
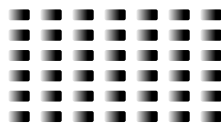
IBM Solution

Access CICS with System z information via mobile devices

ROI in less than 1 month

Custom-designed mobile app for Android and iOS
Re-usable adapters for integration

Up to **6M** transactions/day

04. Is your enterprise ready for the mobile revolution?

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IBM MobileFirst Platform is shaping enterprise mobility

‹ A Smarter Planet

IBM **MobileFirst**

1	2	3
The Broadest Portfolio of Mobile Solutions	The Deepest Set of Services Expertise	New Industry Partnerships and Resources for Developers

IBM **MobileFirst Platform** offers:

Key Offerings Are :

- **IBM Worklight**
- **IBM Rational Test Workbench**
- **IBM Mobile Application Platform Management Services**

- **Native, web, or hybrid app development**
- **Tools to build & test high quality apps for many devices**
- **Management, security, continuous delivery & distribution of Apps**
- **Easy connectivity to existing data & services for mobile usage**
- **On-premises or managed service delivery**

04. Is your enterprise ready for the mobile revolution?