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)

Market share (Q3 2013)

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

7.3%

Drop in average selling price from 2013 to 2017

Source: Apple, Gartner, IDC

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

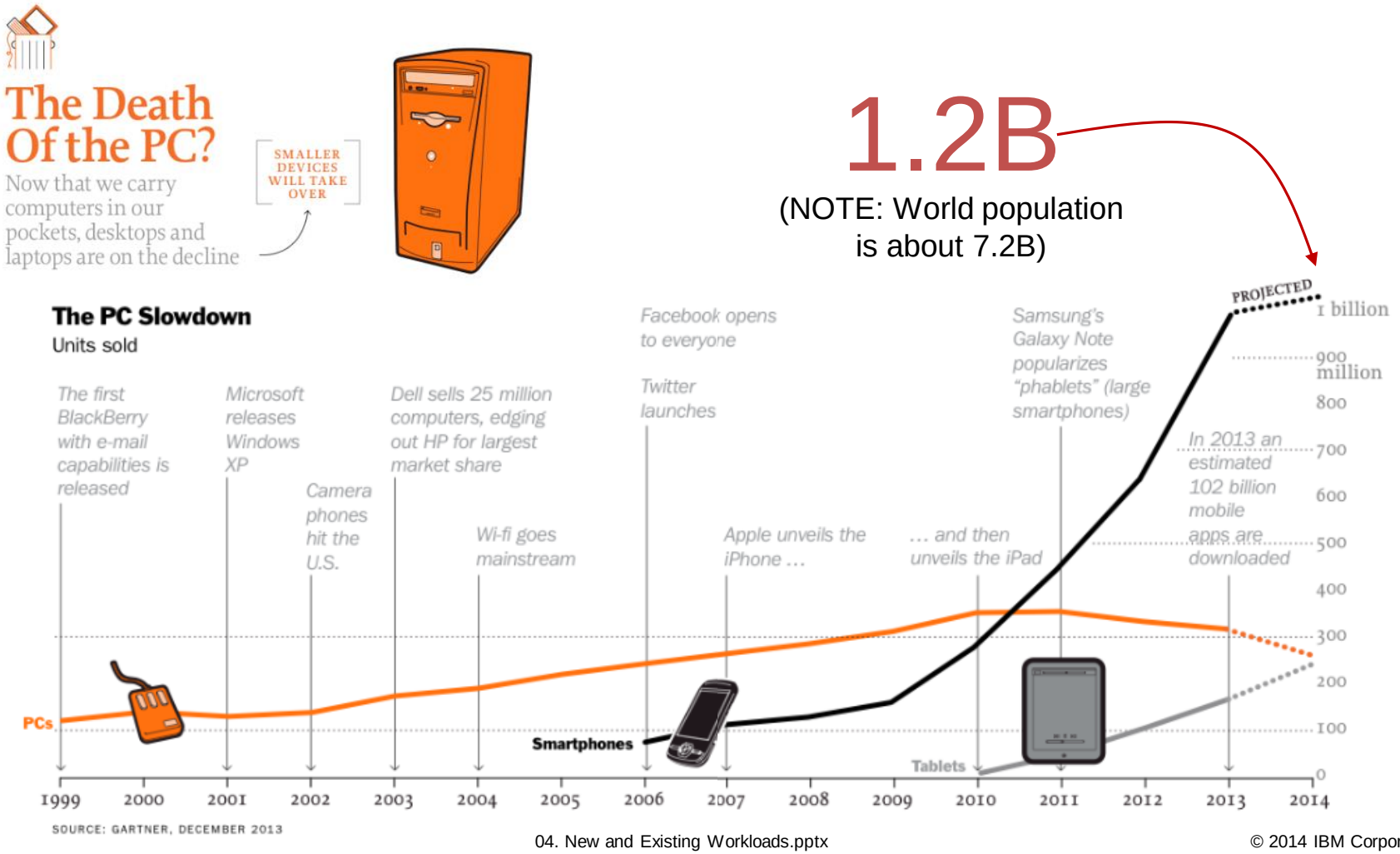
1/3 of citizens access federal government website by logging in from phones or tablets

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

Mobile business truly is HUGE – just look at the numbers!

Time Magazine, January 2014

Projections of mobile growth and PC decline based on Gartner data



A mobile strategy is critically important to business

- Enables premium customer service
- Broadens market reach
- Increases revenue
- Increases operational efficiency

Mobile is a significant component in the evolution of computing

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

- Inconsistent peaks 24/7 are common
- Increased system load
- New versions of apps occurring weekly vs. yearly
- Development, control and support of apps and multiple devices is not 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 is *already* overshadowing the eBusiness revolution
   - Anticipate huge numbers of transactions, with potentially wildly varying fluctuations in numbers
   - Exceptional levels of scalability and elasticity are 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 must 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

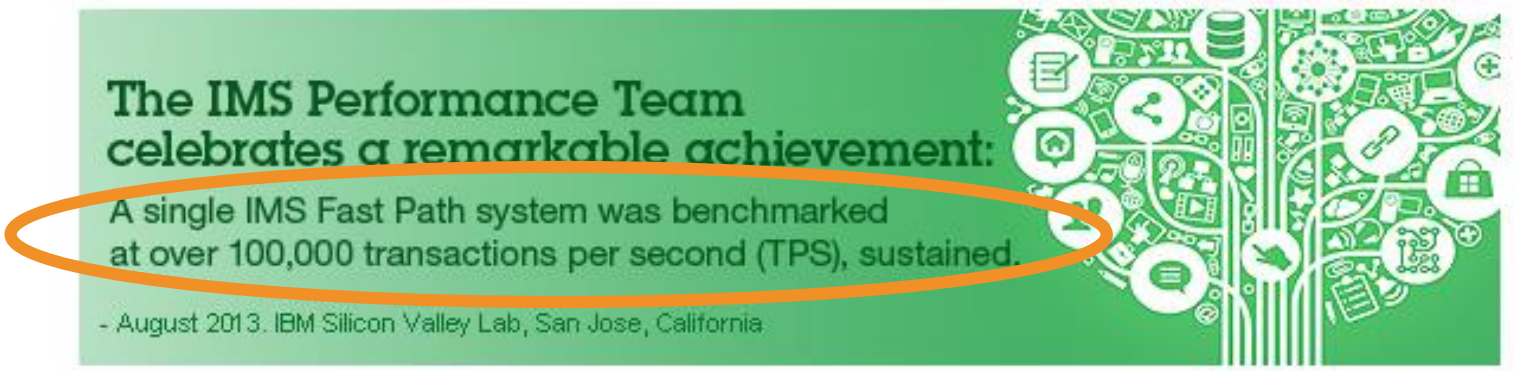
zEnterprise is the data and security “hub” of today’s enterprise businesses

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

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

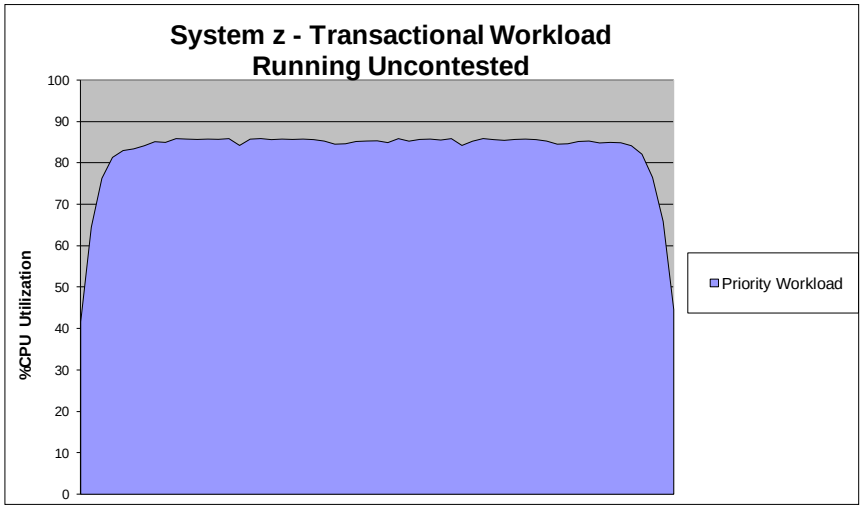


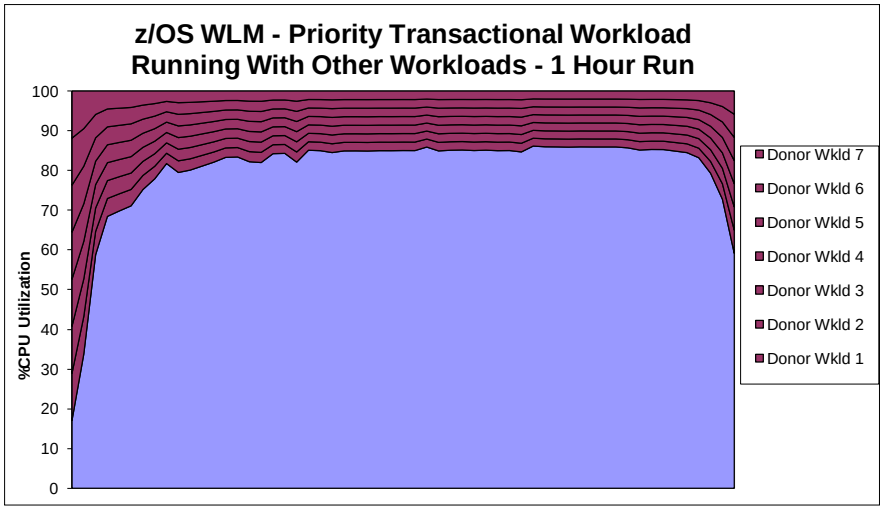
"Typically, we now process around **100 million transactions** each day, but during this year's Easter holiday, online shopping events pushed our daily transactions to a **peak of 128 million**—an increase of more than 10 percent... IBM CICS is of paramount importance to most of our clients."

- Jan Brandvold, EVRY

Source: IBM

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





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

Priority Workload Metrics
Total Throughput: 417.8K
Maximum TPS 129.7

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

Priority Workload Metrics
Total Throughput: 414.7K
Maximum TPS 128.1

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

Source: IBM CPO

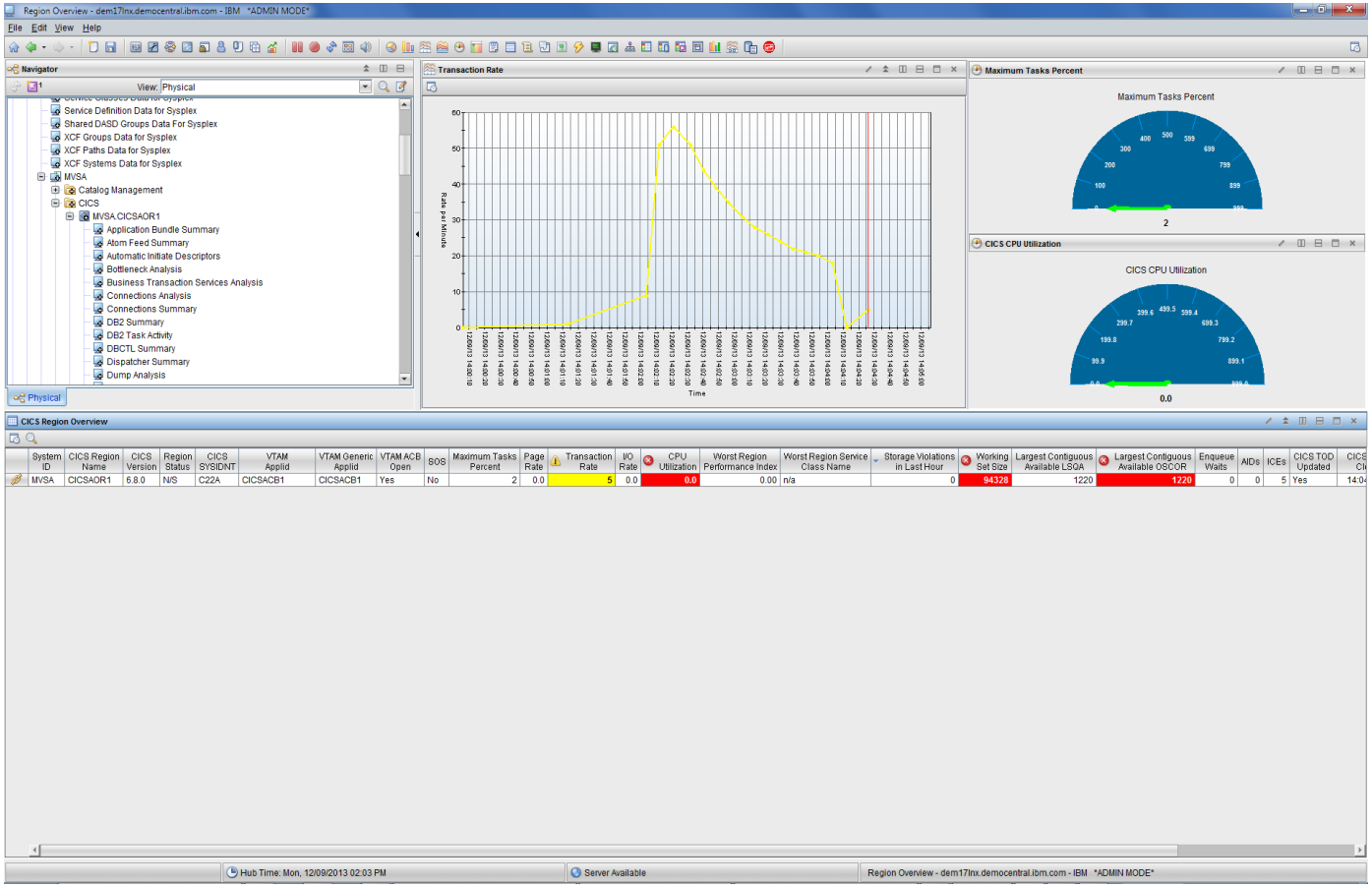
z/OS WLM efficiently balances CICS and IMS workloads to support unpredictable mobile-generated demand

- CICS and IMS integrate tightly with z/OS Workload Manager
- WLM manages CICS or IMS workloads in either of two ways:

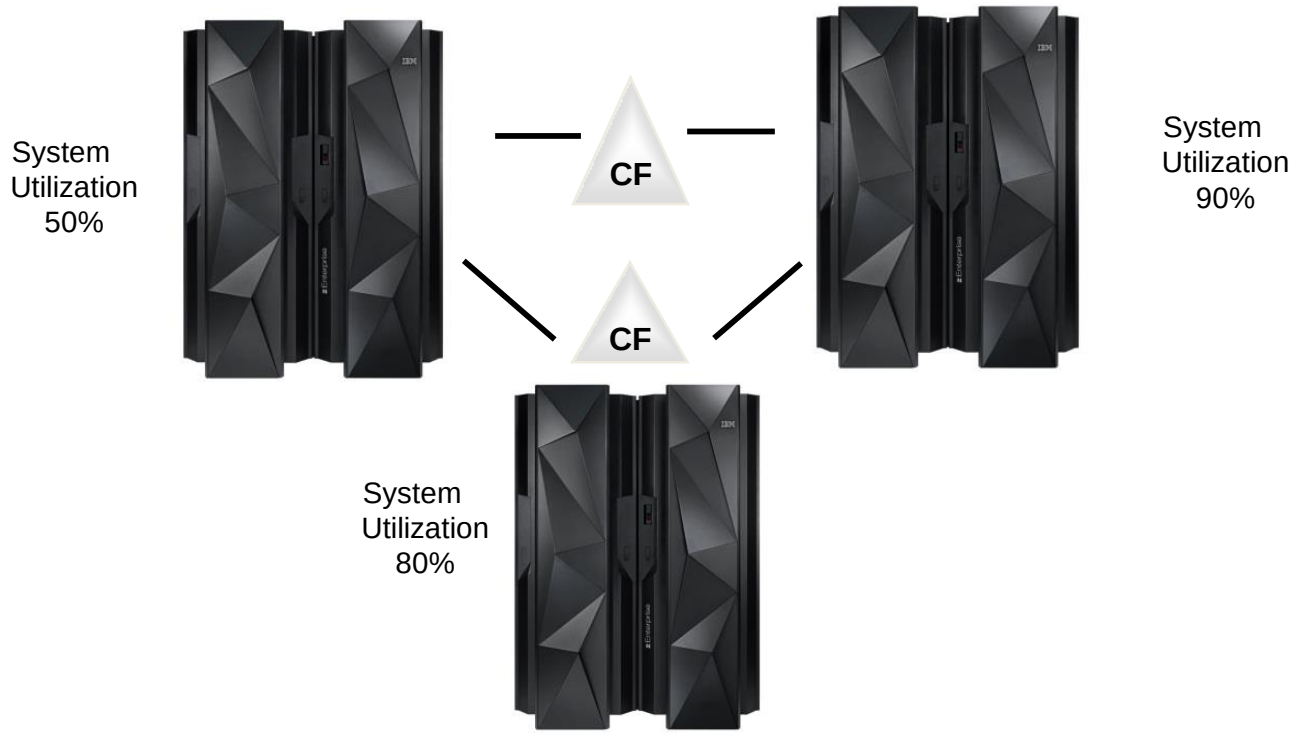
Each workload is given a percentage of total execution time (a.k.a. velocity goal)	Workloads are each given enough execution time to meet specific transaction rate goals
Address space management	Server management

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

DEMO: Perfect workload management for mobile workloads



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

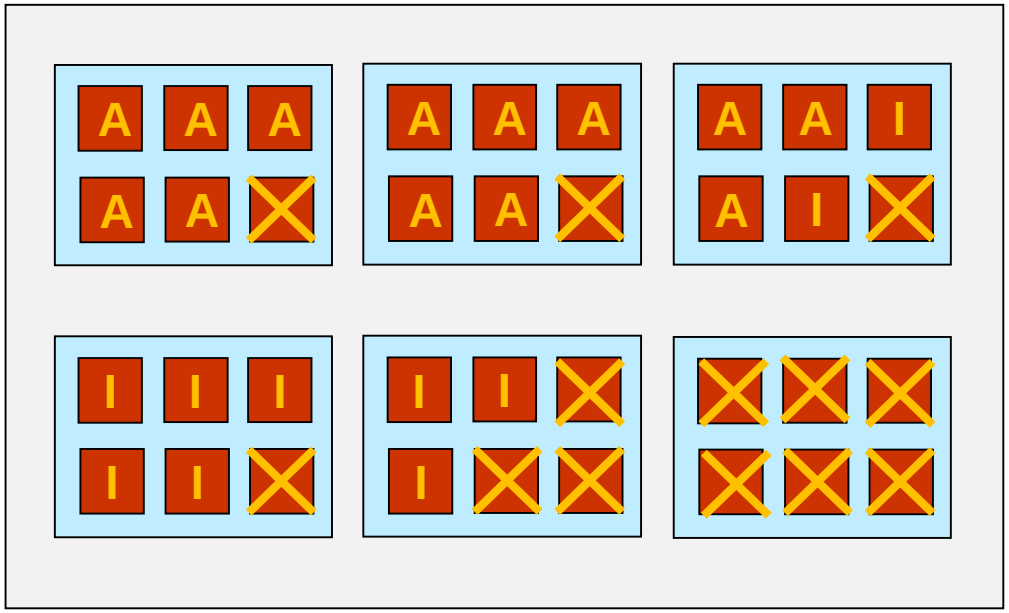


- Servers supporting mobile applications can run in a "virtual" single system
- Mobile transactions are routed to the system best able to handle the peak
- All resources are shared through the Coupling Facility (CF)
- Net result is maximized CPU utilization across several separate physical systems

Add physical processors when needed to handle unexpected peaks

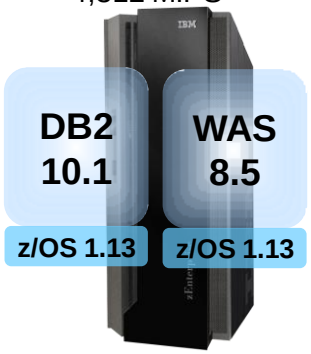
- Capacity on Demand
  - "Books" are shipped fully populated
  - Activate dormant processors as needed
  - Use for temporary or permanent capacity
  - Self-managed on/off
- New capacity is immediately available for work without service disruption

One zEC12 book with 36 processors

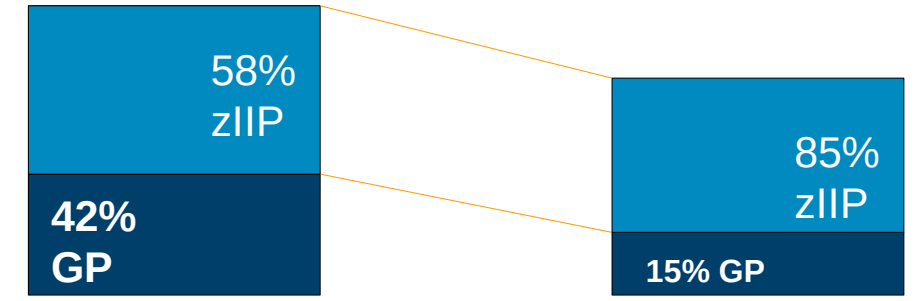


Workload optimization through hardware and software upgrades can reduce costs for mobile workloads

z114-X04 + 4 zIIP
4,312 MIPS



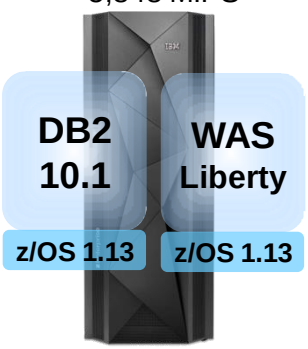
z114



2.31M instructions per user interaction

1.74M instructions per user interaction

zBC12-K06 + 6 zIIP
5,848 MIPS



zBC12

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

$2,449 / UI per sec

3,364 User Interactions per second (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.

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

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

85%

of business transactions are processed on a mainframe

70%

of top 500 System z customers run CICS

23 of top 25

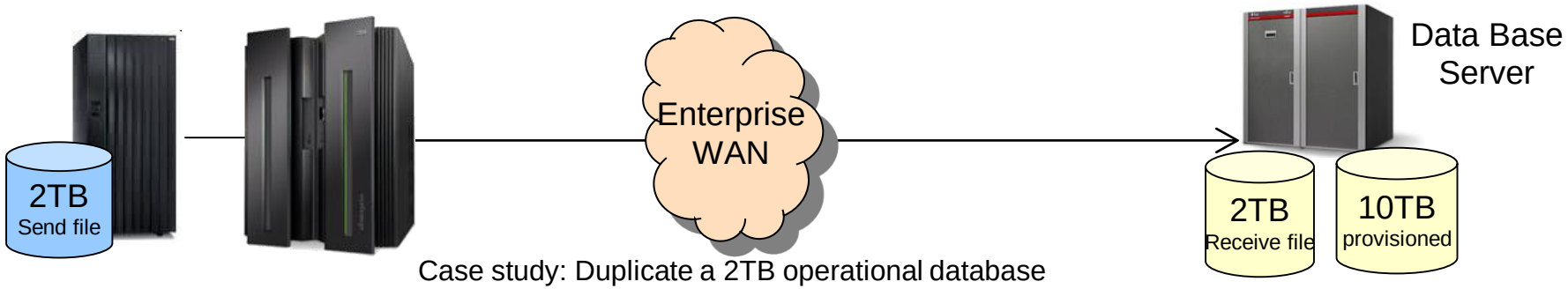
US retailers use System z

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



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

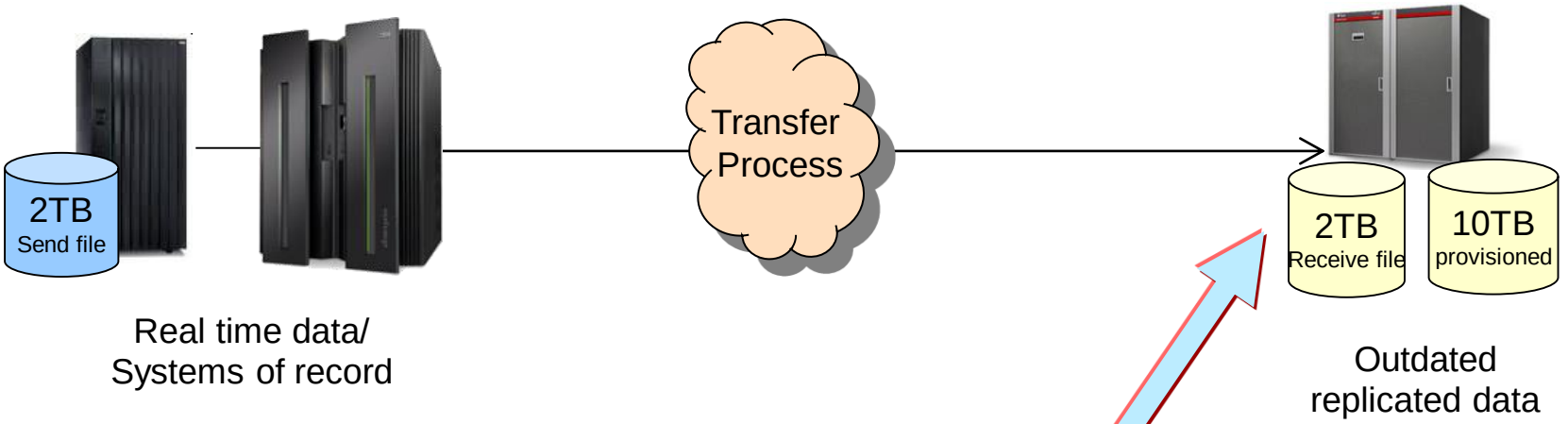
On Premises Network $0.0024/GB x 2048 GB x 4 hops x 365	$7.1K
Off Premises Network $0.29/GB x 2048 GB x 2 hops x 365	$434K

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”



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

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

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

The users are here…

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

Business-critical applications and data are here…

System of Record

Methods for accessing SoR data include:

- CICS Mobile Feature Pack
- CICS Web Services
- CICS Transaction Gateway
- IMS SOAP Gateway

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 IMS Connect and IMS SOAP Gateway 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

University of Florida goes mobile with CICS and System z

Enabling 50,000 students, 5,400 faculty members and staff access to online features anytime, anywhere

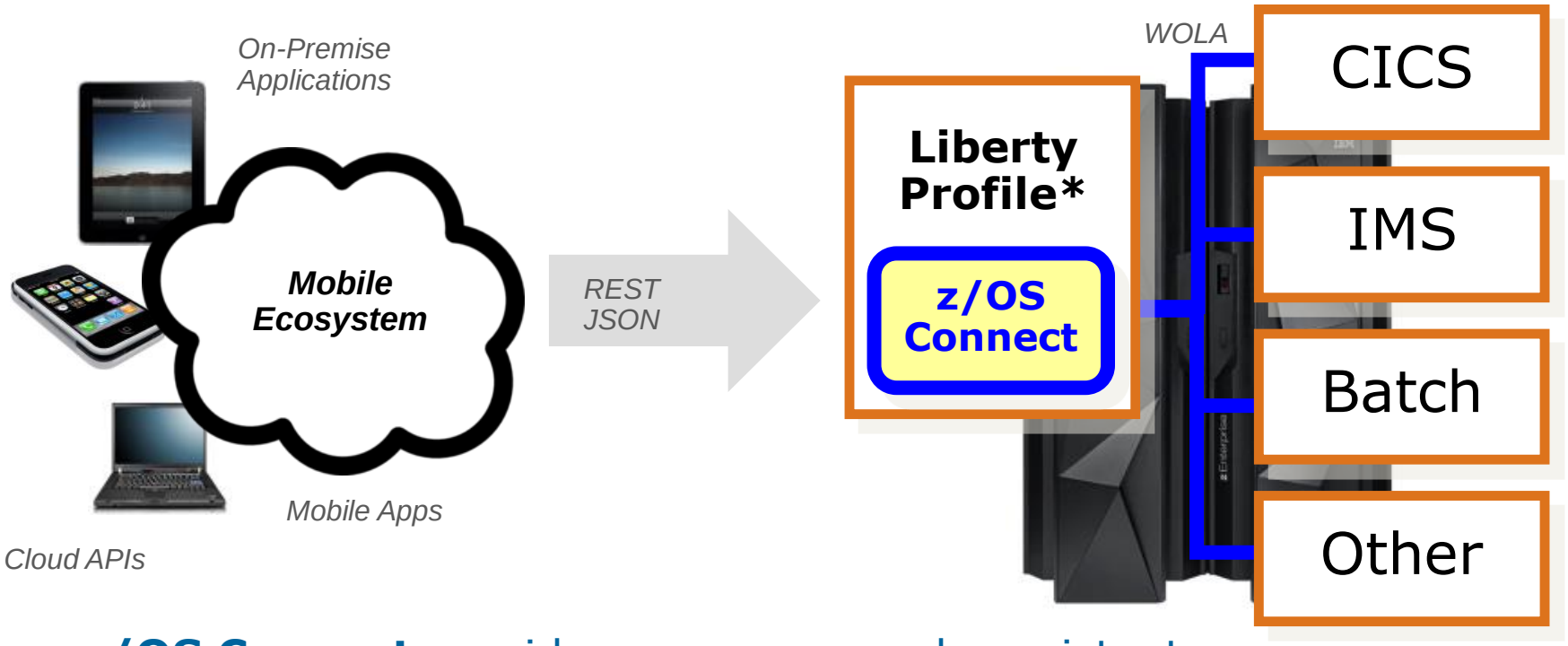
Data provided to students real time
Mobile formatted information of class schedules, textbooks, academic dates, grades, emergency information and campus map

IBM Solution
Accessing CICS with System z information via smartphones

Up to 1M transactions/day

IBM WebSphere Liberty z/OS Connect simplifies access to z/OS SoR transactions from mobile applications

New!



z/OS Connect provides a common and consistent REST/JSON interface to the mainframe

- A no-cost feature – ships with WAS z/OS, CICS and IMS
- Provides a single point for audit and security control
- Simplifies mobile development
- Java – runs in specialty engine
- Works with z/OS services (WLM, SMF, etc.)

** WebSphere Liberty Profile for z/OS – IBM's fast, lightweight, composable and dynamic server runtime*

Mobile Workload Pricing for z/OS helps ameliorate spikes caused by increased mobile usage

Improves the cost of growth for mobile transactions processed in System z environments such as CICS, IMS and DB2

- IBM announced Mobile Workload Pricing for z/OS …

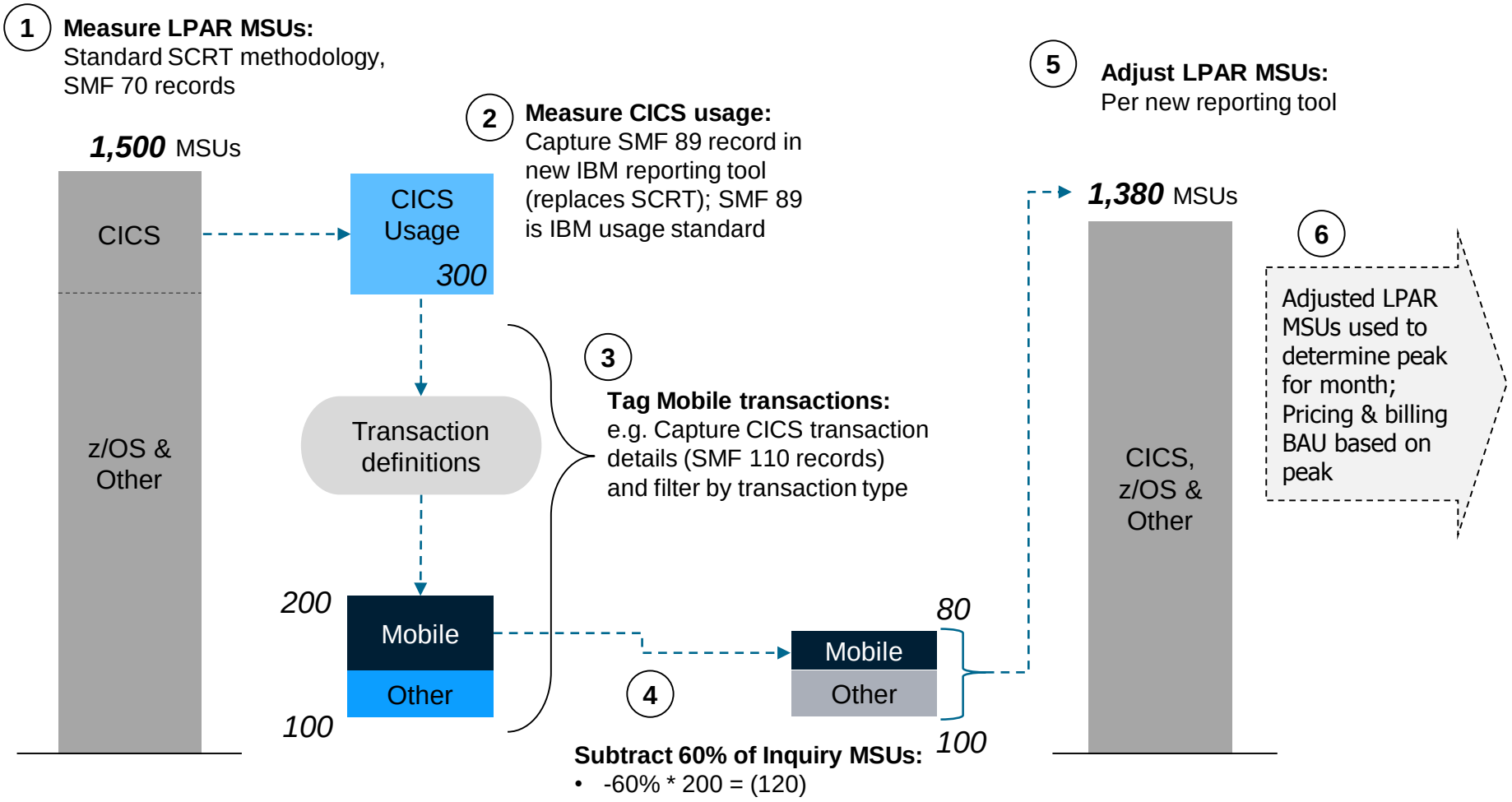
  An enhancement to sub-capacity pricing

  - *Normalizes the rate of transaction growth*
  - *Mitigates the impact of Mobile on MLC charges where higher transaction volumes cause a spike in machine utilization*
  - *Works like an MSU "off-load" from a software pricing perspective, similar to Integrated Workload Pricing, not a defined price discount*

- No infrastructure changes required (i.e. no separate LPARs) … rather an enhanced way of reporting sub-capacity MSUs

- Available to all enterprises running an zEC12 or zBC12 that meet the Mobile workload tracking requirements

CICS Illustration: Mitigating the Mobile impact to LPAR peaks



LPAR MSUs for billing (Standard)

z/OS/Other	1,500
CICS	1,500

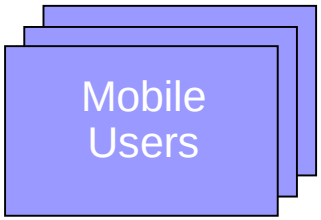
** Figures are for illustrative purposes only. Tracking process and records will vary by customer*

LPAR MSUs for billing (Adjusted)

z/OS/Other	1,380
CICS	1,380

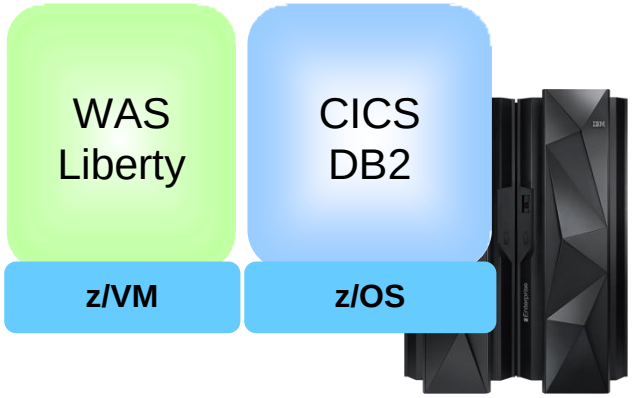
Oracle Coherence on Exalogic increases costs by over 2x for read-only *blended* mobile workloads – *using Mobile Workload Pricing!*

Which platform provides the lowest TCA over 3 years?



- **500 concurrent connections**
- **70% run 1 read/session; 25% run 4 reads/session; 5% run 20 reads/session with 100ms think time**
- **1 second cache invalidation (WXS scenario)**

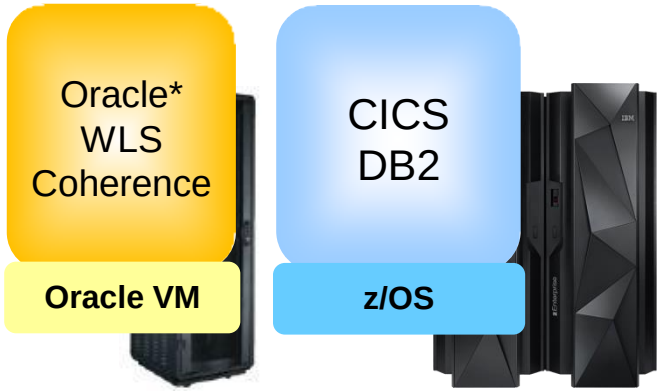
Mobile read-only workload driving minimum throughput of **6,300** transactions per second and response time of 12ms



zEC12-704 + 5 IFLs
635 MSUs

$10.4M (3 yr. TCA)
Prod only

$13.7M (3 yr. TCA)
Prod+Dev/QA+DR
Mobile Workload Pricing



Exalogic X4-2 1/8th Rack
(30 cores pro-rated)

zEC12-704
529 MSUs

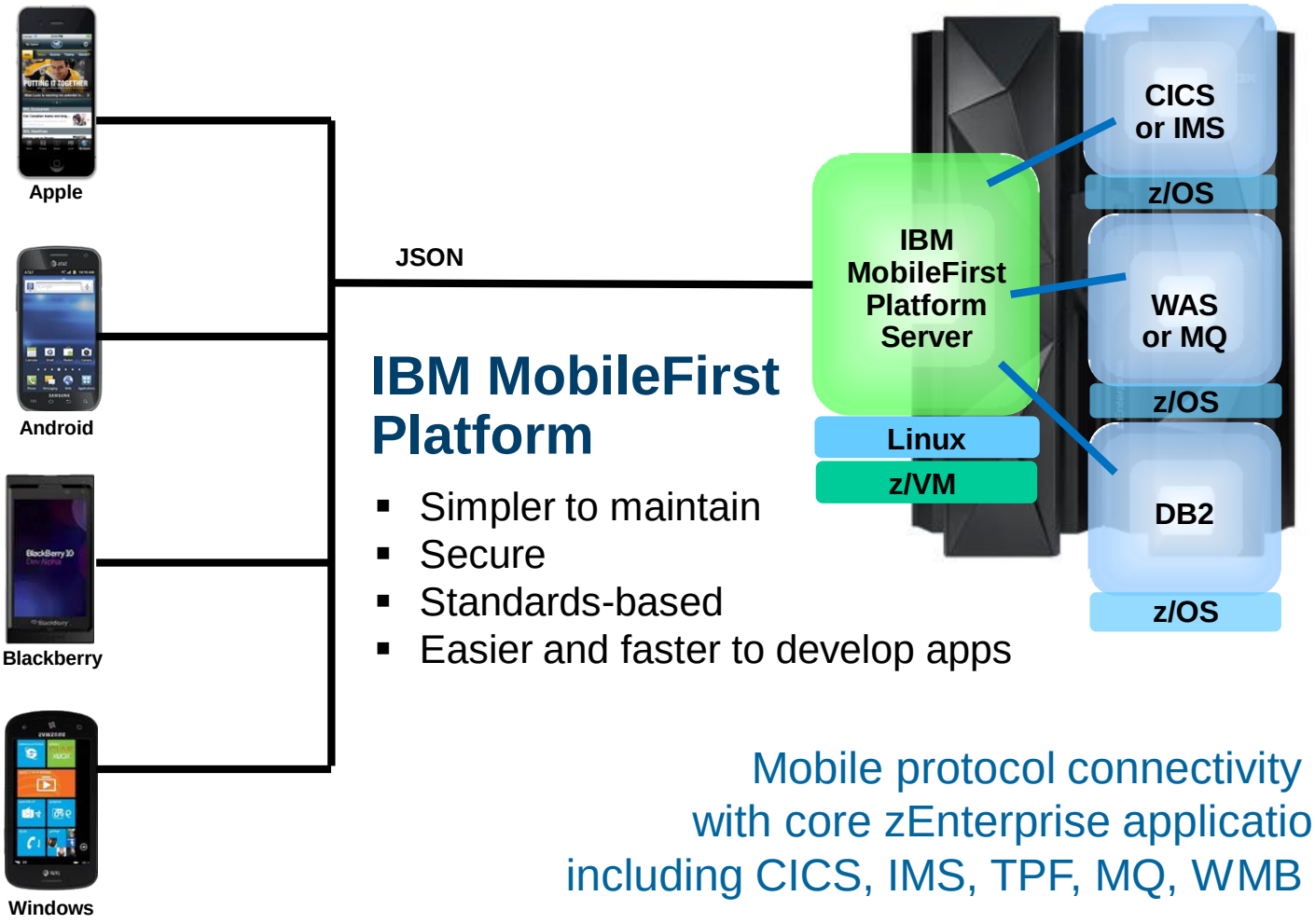
$19.9M (3 yr. TCA)
Prod only

$28.9M (3 yr. TCA)
Prod+Dev/QA+DR

*Over **2x** higher cost!*

* Oracle Coherence performance projected from WXS Caching Test

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



IBM MobileFirst Platform

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

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

IBM MobileFirst Platform 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;
```

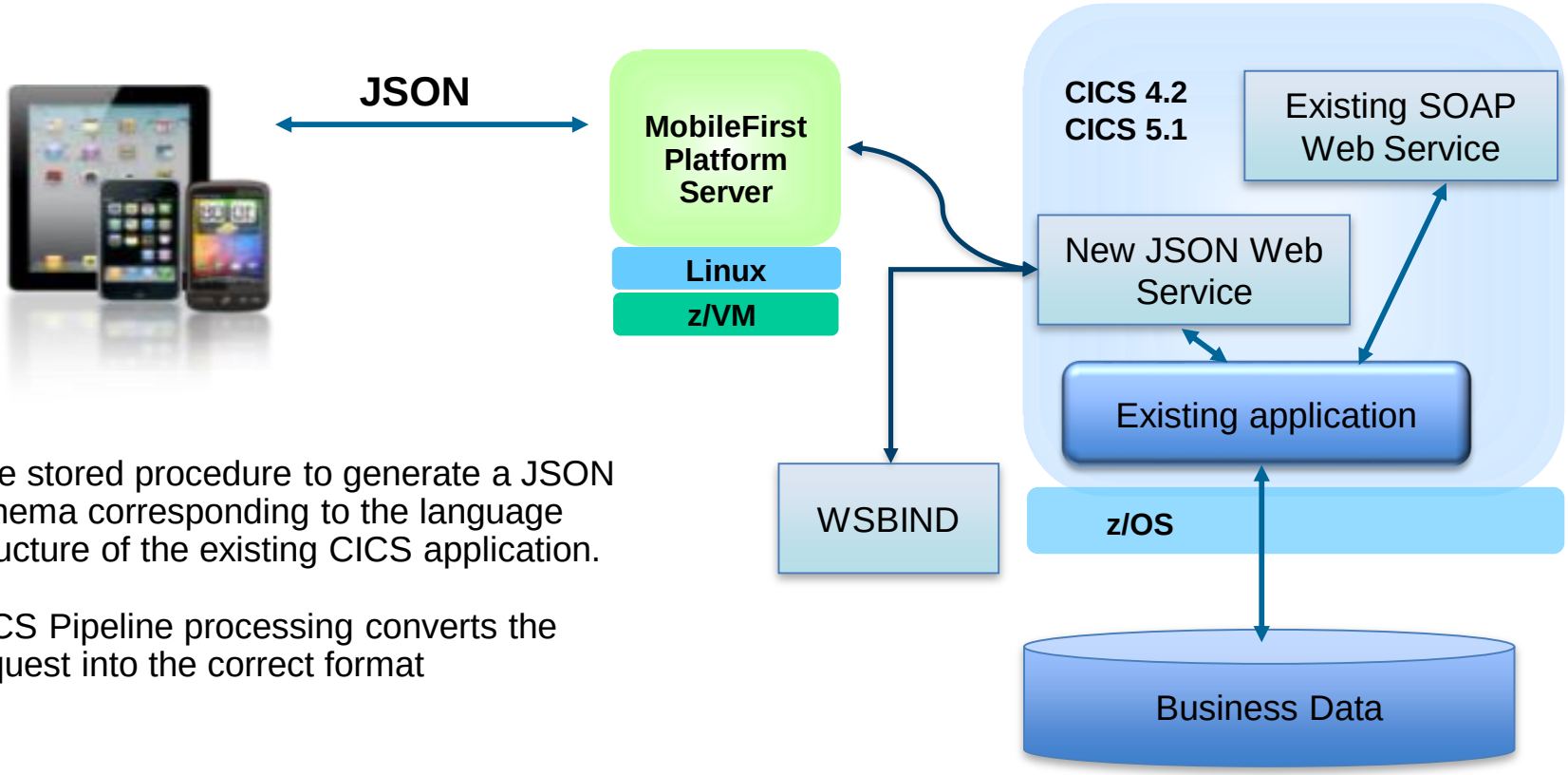
Name-value pair structure

Simple data access

JSON interface binds CICS applications to MobileFirst Platform Server

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

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



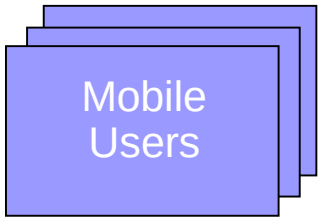
Use stored procedure to generate a JSON schema corresponding to the language structure of the existing CICS application.

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

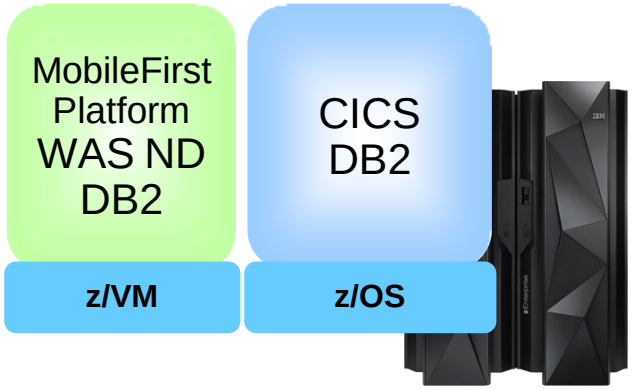
Co-locating MobileFirst Platform on System z increases Throughput by 61%, reduces Response Time by 36%, and reduces costs by 16%

Which platform provides the lowest TCA over 3 years?



- **400 concurrent users**
- **60% Login, 30% Add or Delete,10% Update**

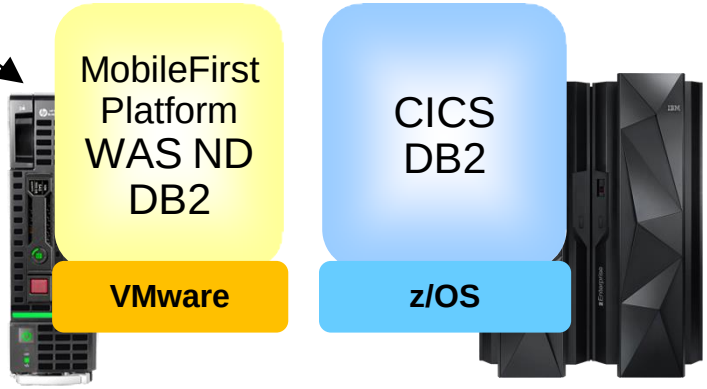
Mobile Insurance workload using Mobile Workload Pricing



zEC12-410 + 6 IFLs

3,446 tps
131.4 ms RT
$2,208 per tps
(3 yr. TCA)
Prod + Dev/QA + DR

16% *lower cost!*



HP ProLiant BL460c
Intel E5-2697v2 2.7GHz 6co

zEC12-406

2,145 tps
205.4 ms RT
$2,617 per tps
(3 yr. TCA)
Prod + Dev/QA + DR

* 3-Year TCA includes list prices for Hardware and Software total cost for front and back end incorporating Mobile Workload Pricing for zOS components. Sizing shown is for Production to which 30% is added for System z for Dev/QA and CBU pricing for DR and 2x for Distributed

Major international retailer goes mobile with CICS and System z

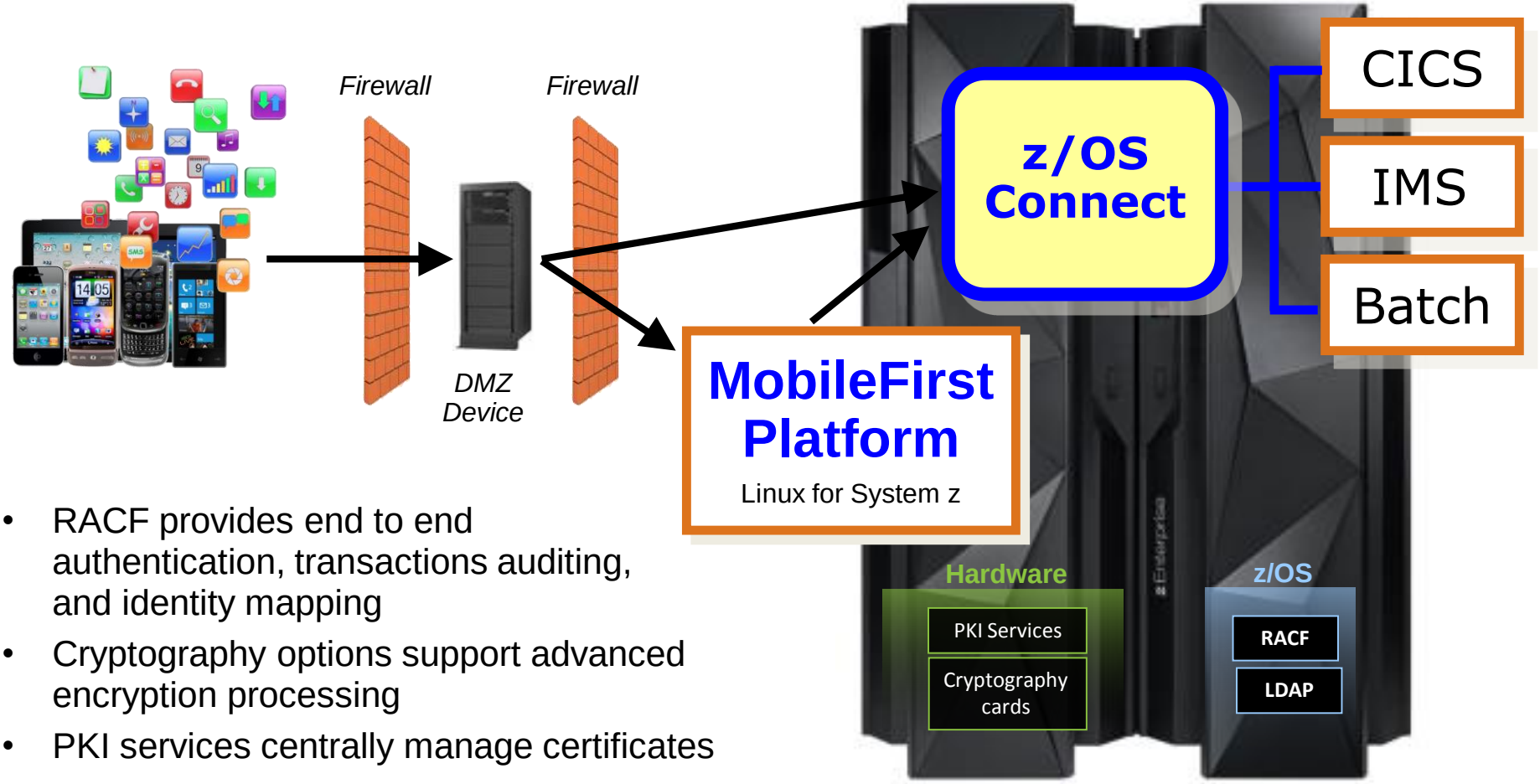
IBM MobileFirst Platform enables mobile access to an existing CICS warehouse application

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

End to end security from mobile to the mainframe and back



- RACF provides end to end authentication, transactions auditing, and identity mapping
- Cryptography options support advanced encryption processing
- PKI services centrally manage certificates
- DMZ devices (e.g., DataPower) provide secure integration gateway, centralized key management and mobile access policies
- High level security connection to backend applications

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

Databases

Guardium

DB2
IMS
VSAM

Security devices
Networks
Configurations
User Activity
Threat Intelligence

QRadar

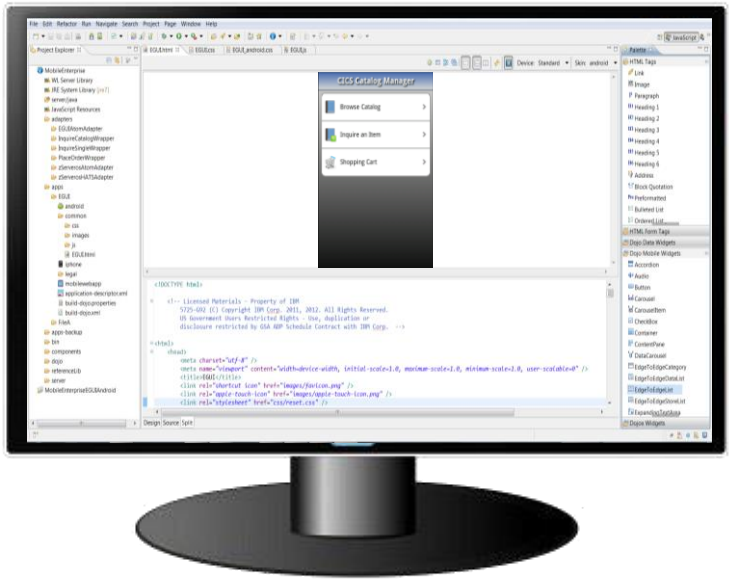
Event correlation
Activity baselining
Anomaly detection
Offense Identification

- 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

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

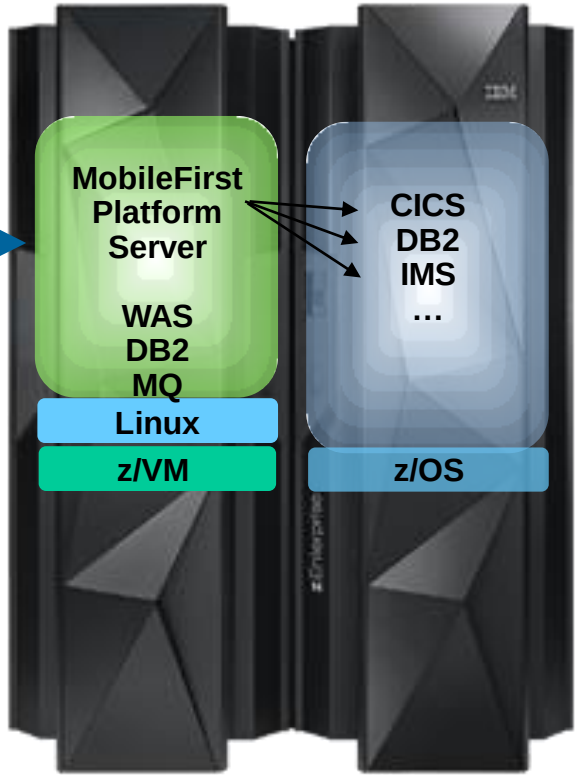
DEMO: Easily and quickly extend mainframe-based business applications to mobile users

Develop



IBM MobileFirst Platform Studio

Deploy



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

ABK-Systeme GmbH (Germany)

German software company develops financial services packages used by most leading banks in Germany and 100+ other foreign banks

Business challenge:

- Needed to maintain competitive advantage and meet customer demands
- Required a highly flexible development platform that would also be cost-effective
- Faced increasing demand to add mobile capability to their portfolio

Solution:

- First, implemented an IBM zBC12 running Linux and migrated their COBOL applications over
- Next, added IBM MobileFirst Platform as a simple, affordable and tightly integrated platform to accelerate the development, testing and quality assurance of mobile applications

Benefits:

- zBC12 performance surpassed testing goals by 400%, while also reducing energy costs
- Single development repository simplifies application version management
- Development cycles shortened, with faster time to market

IBM MobileFirst Platform *eliminates the need to develop applications for multiple architectures more than once, which saves time for developers and reduces associated costs.*

IBM MobileFirst Platform is shaping enterprise mobility

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 MobileFirst Platform**
- **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**