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?
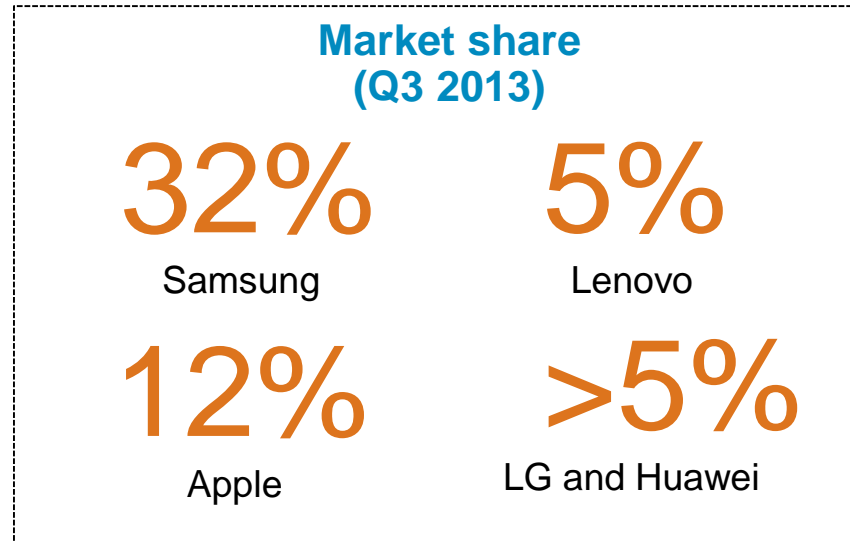
1.9B

Number of Mobile Phones sold in 2013

53% Were Smart Phones

1.2B

Conservative Number Of Smart Phones To Be Sold In 2014

(NOTE: world population is about 7.1B)

Market share (Q3 2013)

32% Samsung	**5%** Lenovo
12% Apple	**>5%** LG and Huawei

Source: Apple, Gartner

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

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

Mobile banking transactions grew at **138%** CAGR from 0.3B in 2008 to 9.4B in 2012

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

A mobile strategy is critically important to business

- Enables premium customer service

- Broadens market reach

- Increases revenue

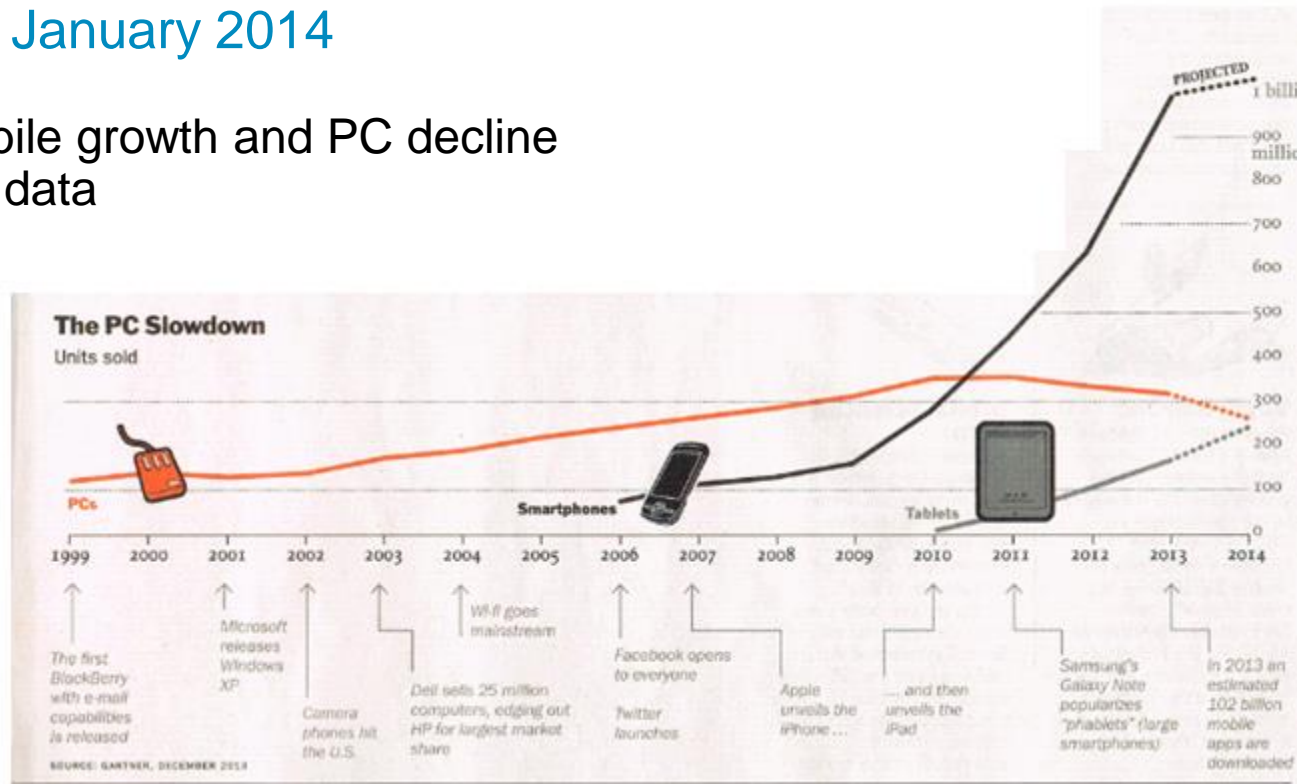- Increases operational efficiency

Mobile/Wireless/Cloud

Web/Desktop

Client/Server

Mobile is a significant component in the evolution of computing

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

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

- **Inconsistent peaks 24/7 are common**
  Peaks of data can occur any time of day, with exploding micro activity levels that are difficult to predict

- **Increased system load**
  Increases in overall transaction rates will occur due to ease in accessing the data anytime

- **New versions of apps occur weekly vs. yearly**
  Customers will expect new features weekly vs. once a year

- **Development, control and support of apps and multiple devices is not standard**
  Users are not sophisticated, but they will want their apps fully supported regardless of standards

- **Security and privacy are paramount**
  Data must be secured from device to data

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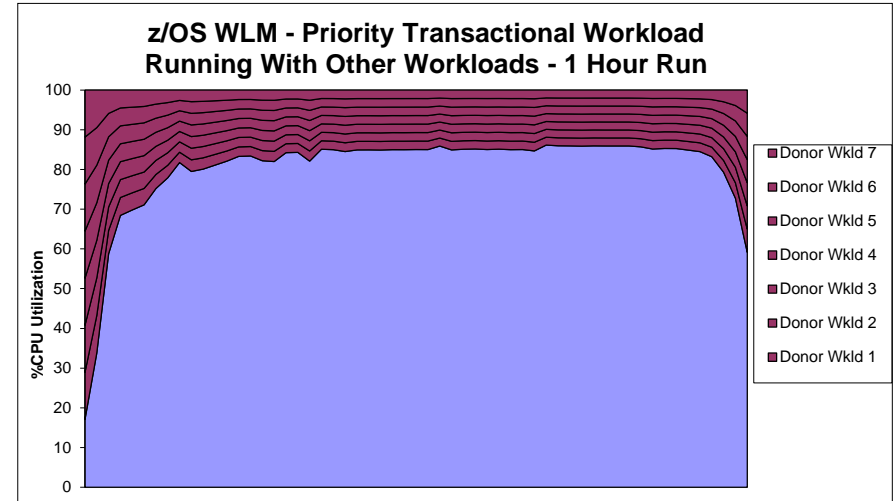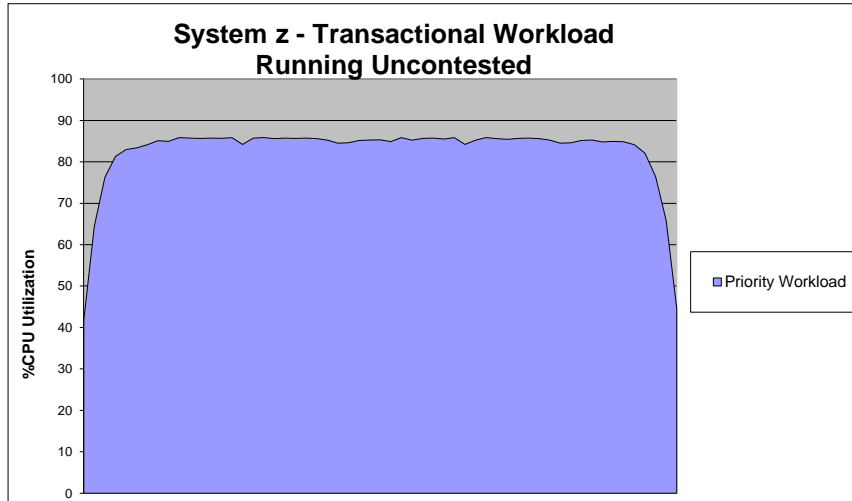
- August 2013. IBM Silicon Valley Lab, San Jose, California

"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

Legend: ■ Priority Workload

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

%CPU Utilization

Legend:
■ 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:

WLM manages the delay of a workload as a percentage of its execution time (a.k.a. velocity goal)

WLM manages response time goals for specific transactions, and insures CICS and IMS have enough resources to meet the goal

Address space management

Server management

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

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DEMO: Perfect workload management of CICS and mobile workloads

14
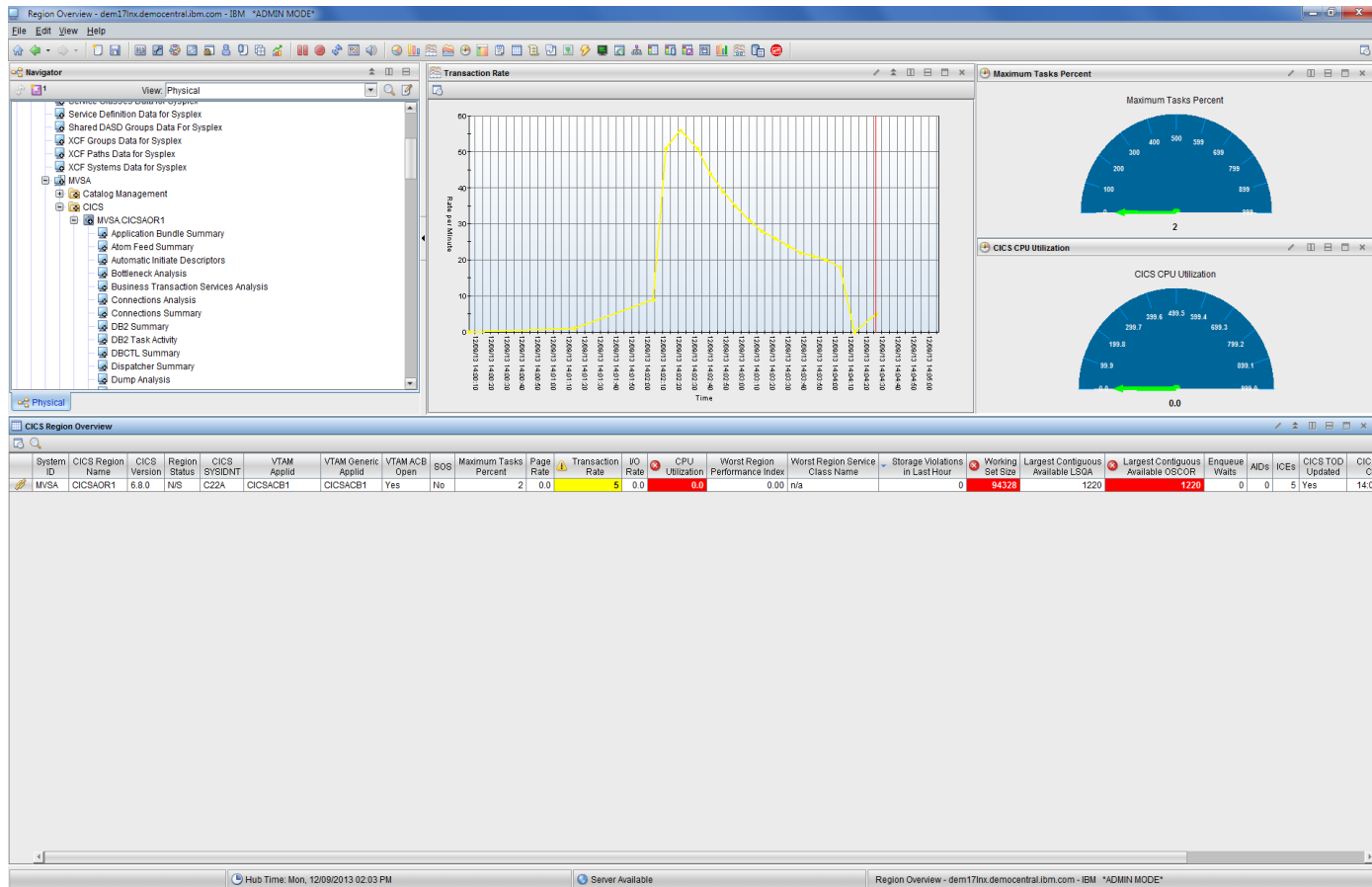
Add physical processors when needed to handle unexpected peaks

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

Active processors – pay full price

Inactive processors (On/Off CoD) – pay only 2% of full price

Dark processors (unused) – no charge

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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

zBC12-K06 + 6 zIIP
5,848 MIPS

DB2 10.1   **WAS Liberty**

z/OS 1.13   z/OS 1.13

zBC12

58% zIIP

42% GP

2.31M instructions per user interaction

85% zIIP

15% GP

1.74M instructions per user interaction

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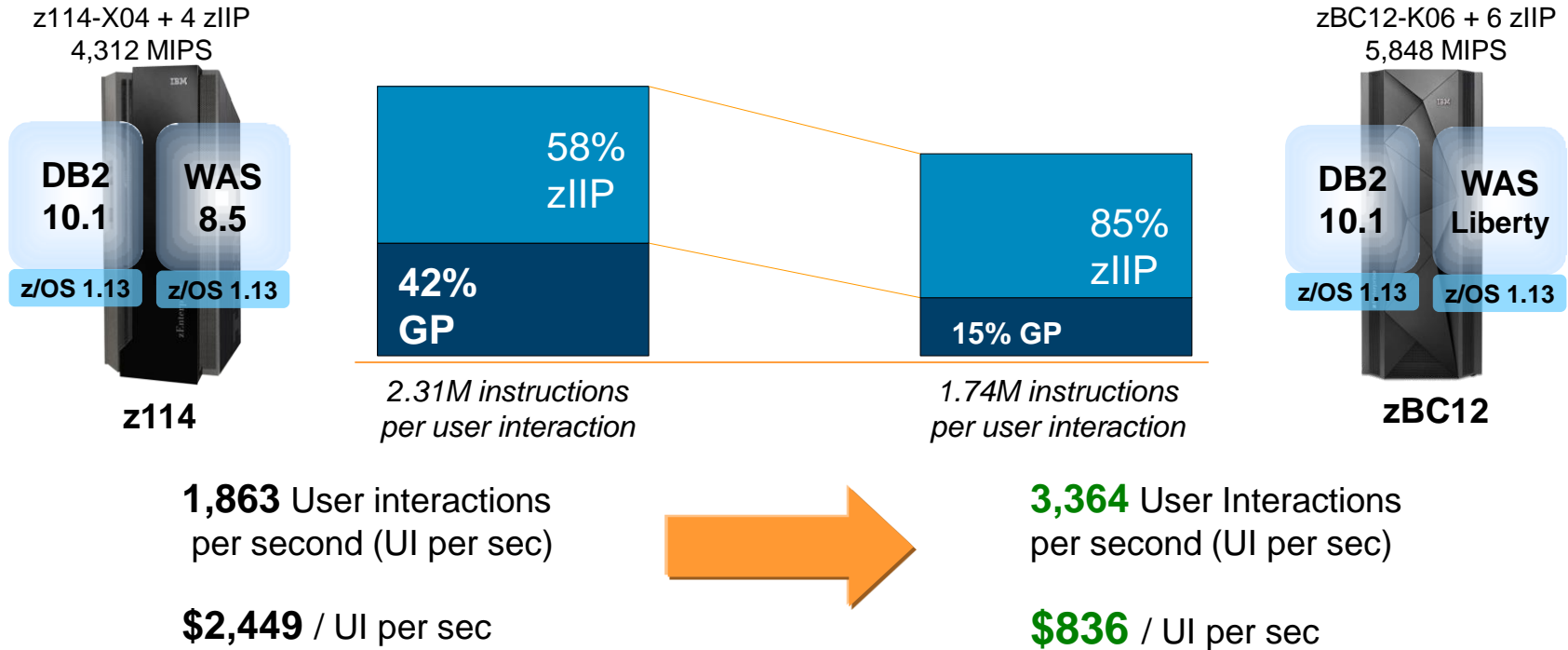
- **Latest generation of specialty processors support more workload**
- **Latest release of WAS (Liberty profile) uses specialty engines more efficiently, drives higher overall transaction rate**

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

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

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

z/OS

CICS
DB2
IMS
…

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
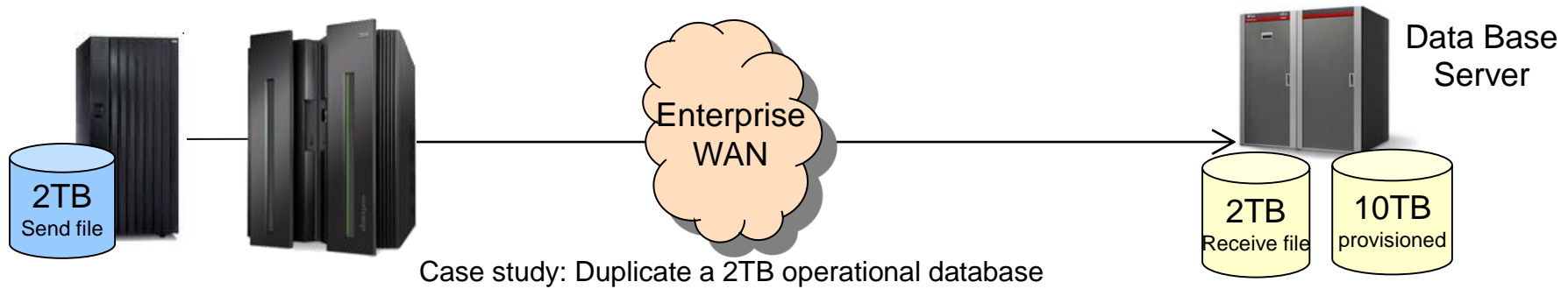
70 of top 75 world's banks use System z

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

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

Annual Transfer Costs
$2.2M

Database analysis costs not included
Based on IBM internal study

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

Transfer Process

2TB
Send file

Real time data/
Systems of record

2TB
Receive file

10TB
provisioned

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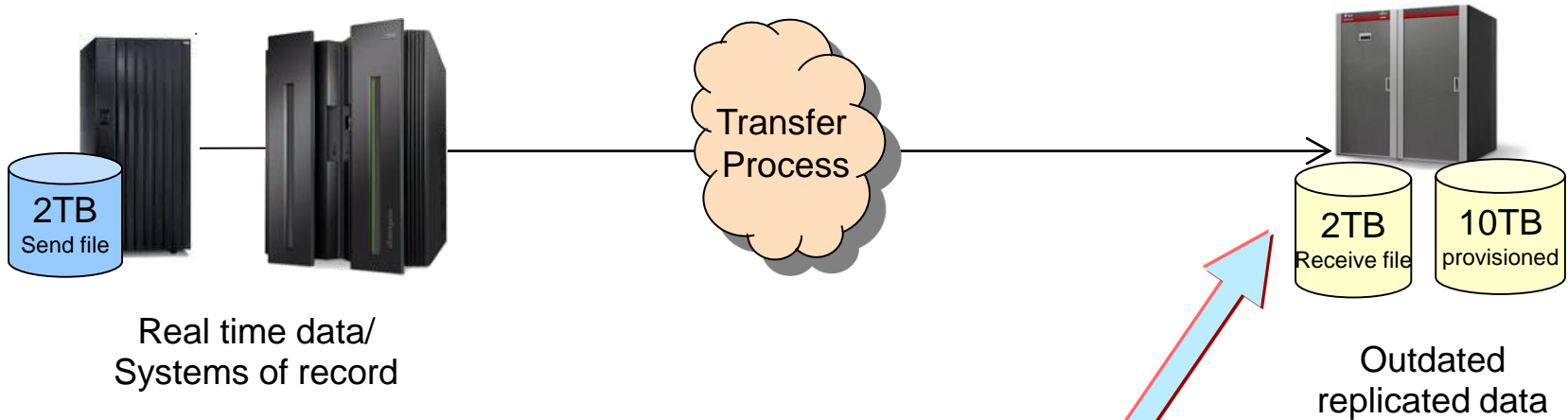
Mobile customers will not tolerate operating against old, unauthentic data!

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

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*

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

HTTP/MQ
Web Services

Application

HTTP
ATOM Feeds

HTTP
REST

TN3270
3270

CICS

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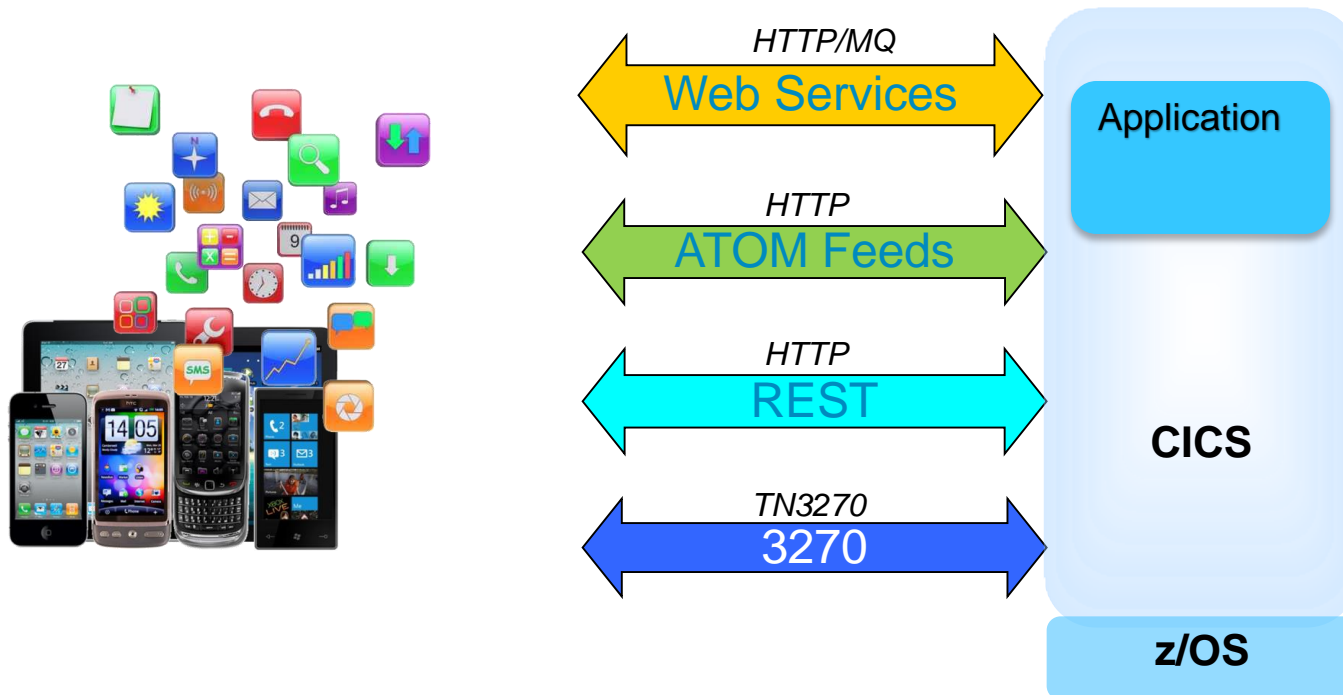
- CICS supplies necessary tools and runtime for Web Services binding, language structures and XML (available since CICS TS 3.1)

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

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

A centralized strategy for mobile services has its advantages

SDKs

Worklight Studio

HTML5, Hybrid, and Native Coding

Optimization Framework

Integrated Device SDKs

3rd Party Library Integration

Build Engine

iOS
Android
Blackberry
Windows Phone
Windows 8
Java ME
Mobile Web
Desktop Web

Worklight Server

Enterprise Backend Systems & Cloud Services

User authentication and mobile trust

Mashups and service composition

JSON Translation

Adapter Library for backend connectivity

Stats Aggregation

Client-Side App Resources

Direct Update

Mobile Web Apps

Unified Push Notifications

Device Runtime

Cross-Platform Compatibility Layer

Server Integration Framework

Encrypted and Syncable Storage

Runtime Skinning

Application Code

Introducing IBM Worklight…

- Easier and faster to develop apps

- Simpler to maintain

- Secure

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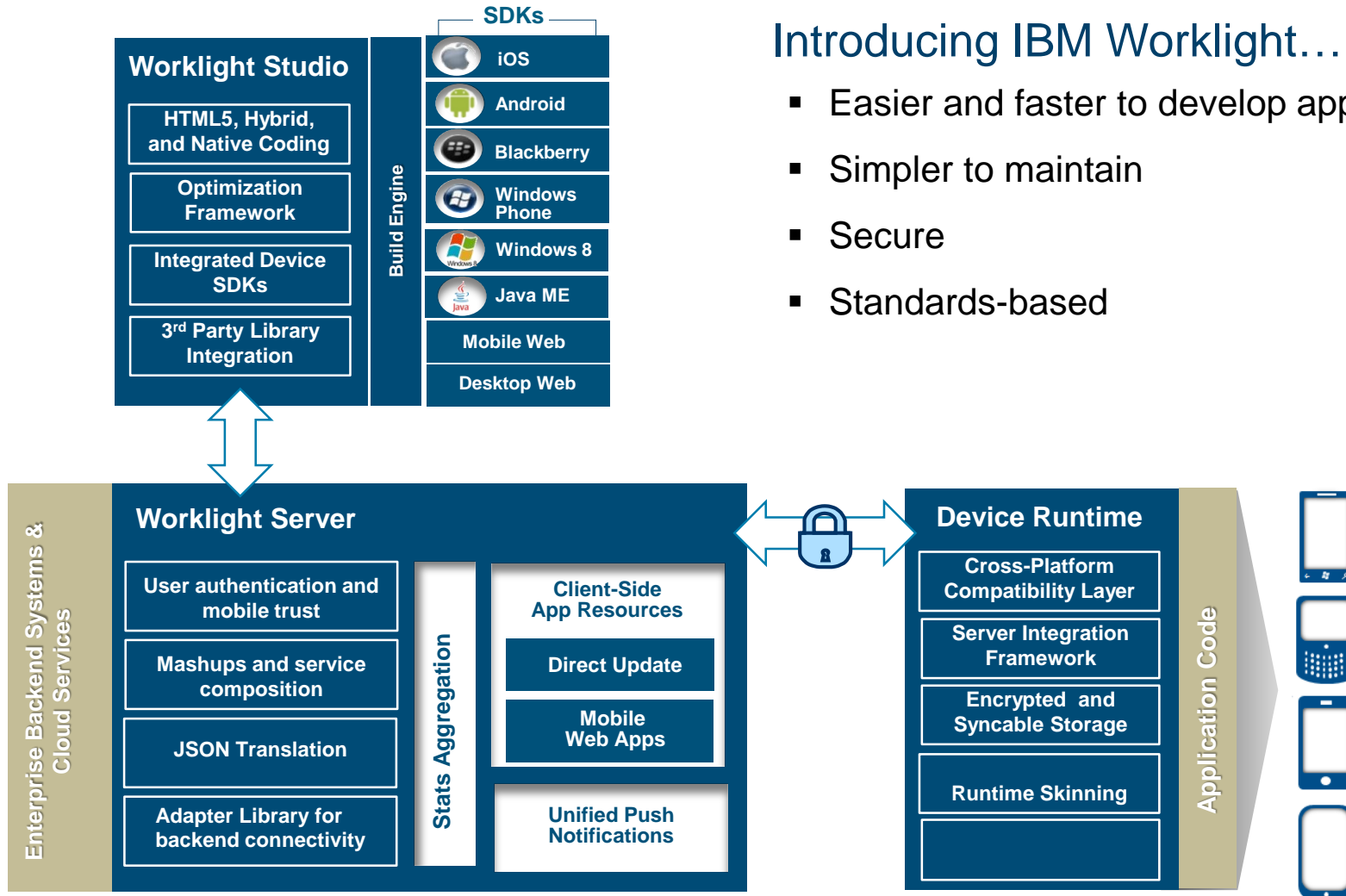
Centralized server technology provides a platform to manage and drive all mobile applications

Apple

Android

Blackberry

Windows

JSON

Worklight Server

Linux

z/VM

CICS or IMS

z/OS

WAS or MQ

z/OS

DB2

z/OS

IBM
Worklight

- Server side software components and adapters for channeling zEnterprise applications to mobile devices
- Transforms enterprise data into mobile-friendly, JSON format
- Manages caching, data synchronization and end-to-end encryption
- Mobile protocol connectivity with core zEnterprise applications including CICS, IMS, TPF, MQ, WMB and DB2

JSON interface binds CICS applications to Worklight Server

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

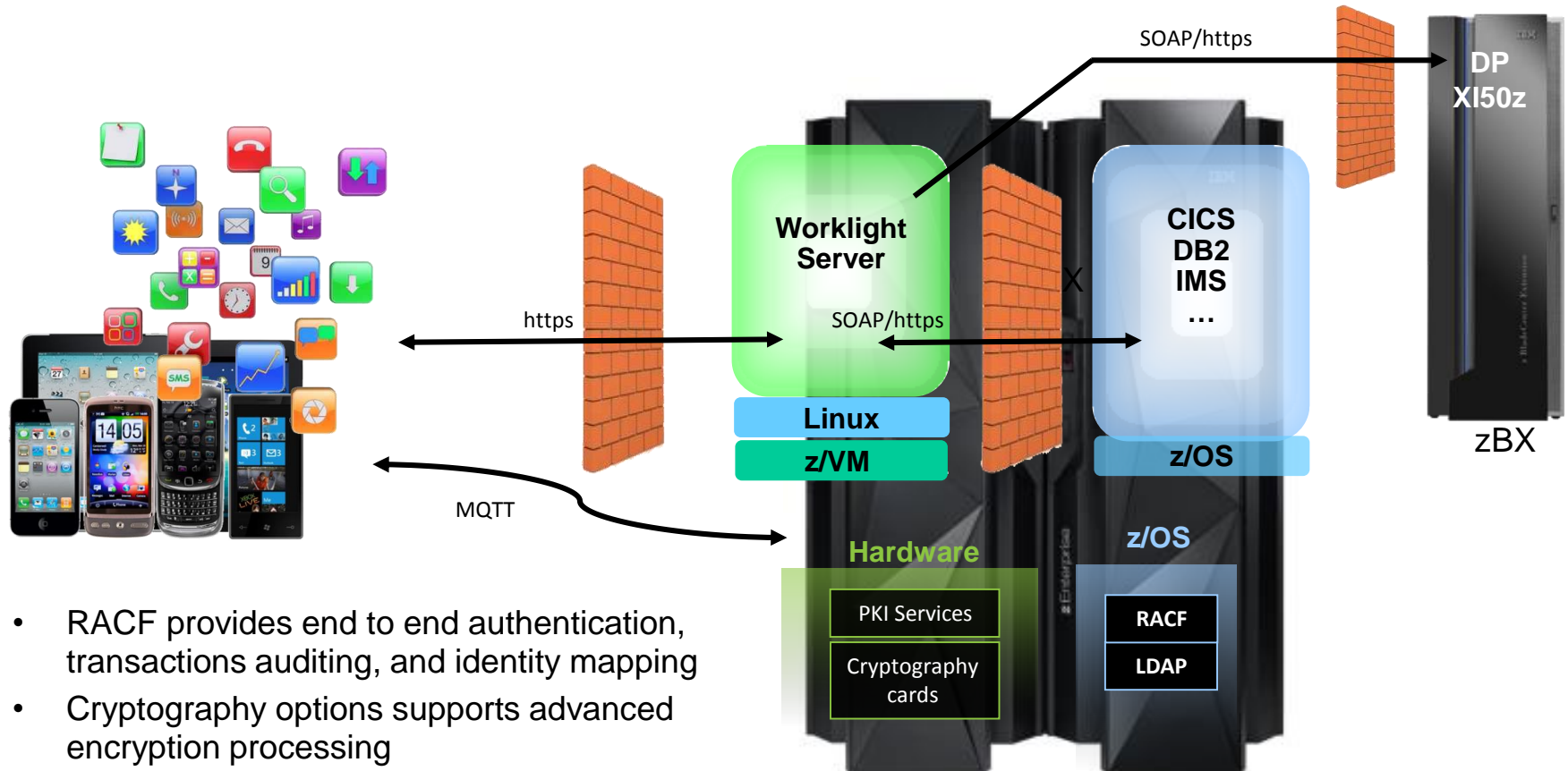Existing SOAP Web Services remain unaffected by the introduction of new mobile based clients

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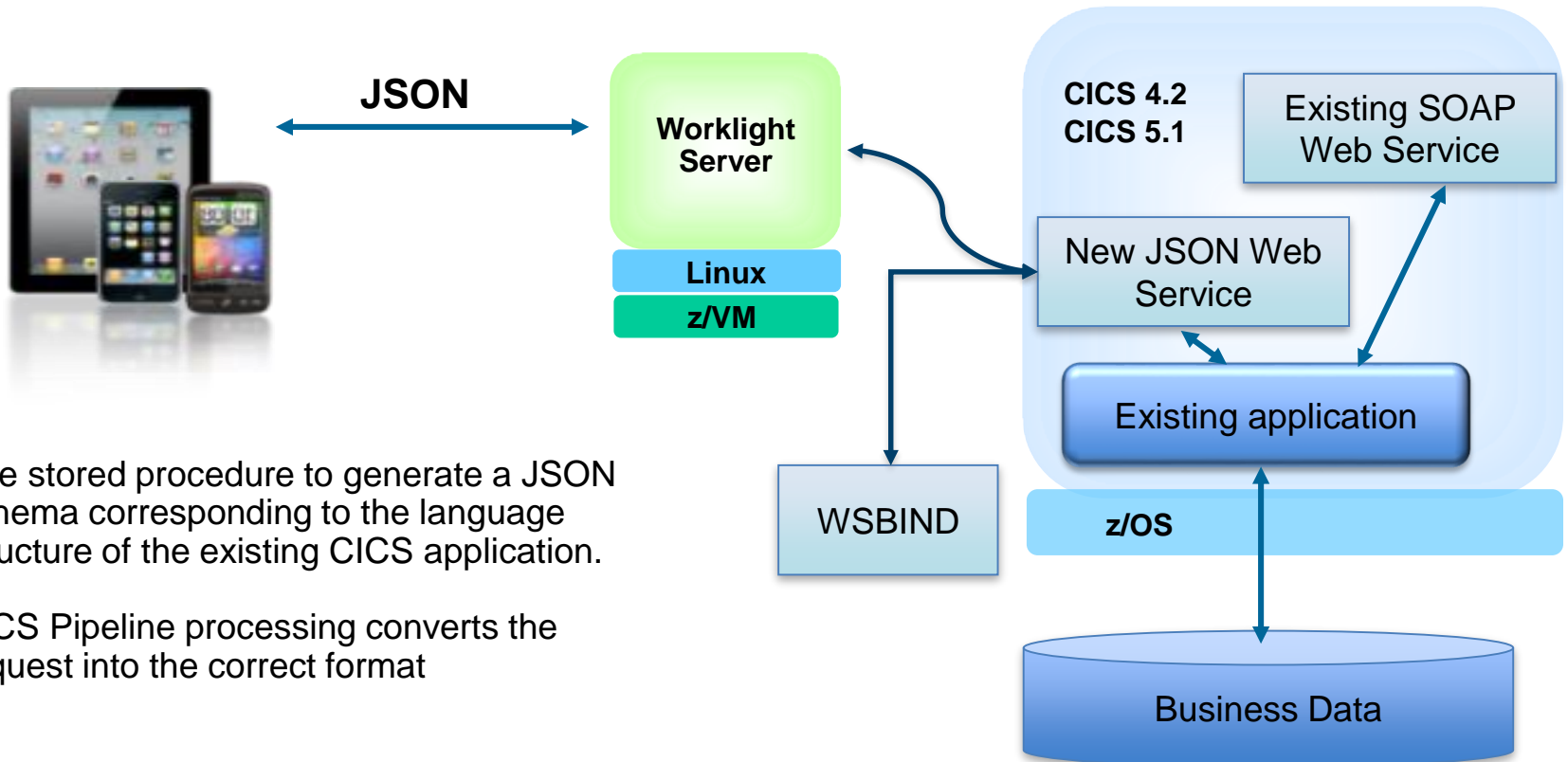
Use stored procedure to generate a JSON schema corresponding to the language structure of the existing CICS application.
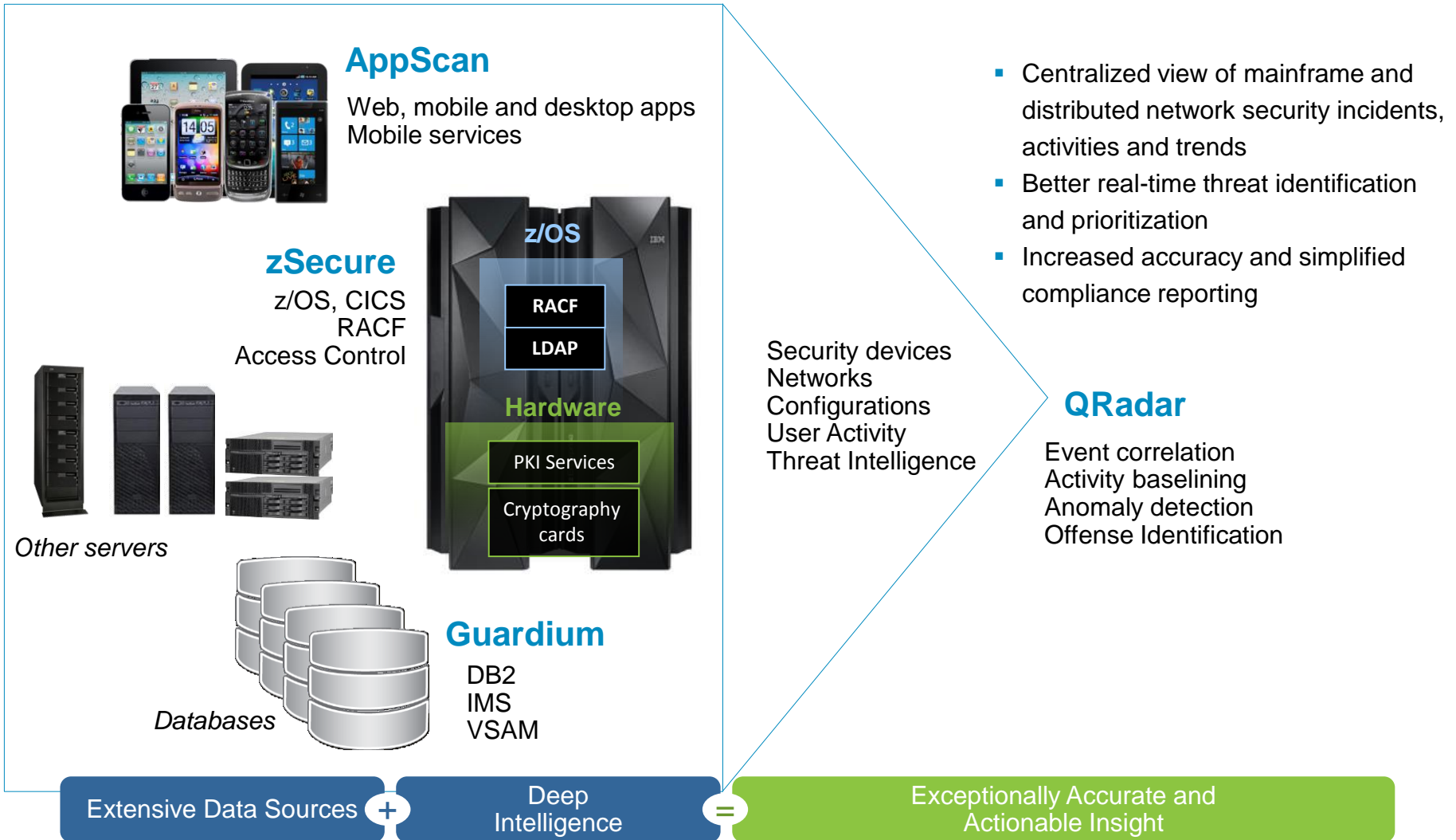
CICS Pipeline processing converts the request into the correct format

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
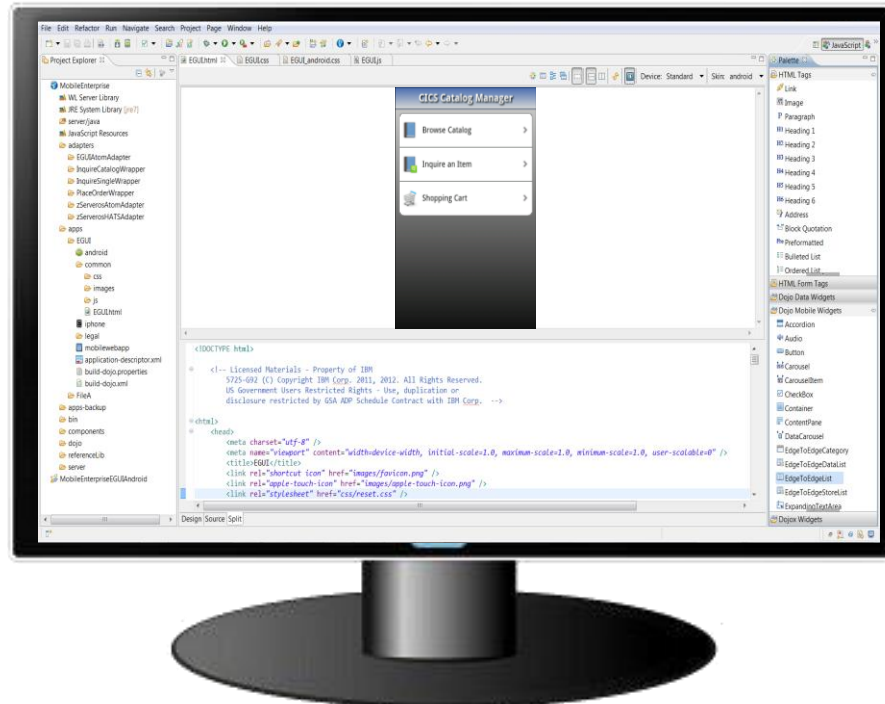

- RACF provides end to end authentication, transactions auditing, and identity mapping
- Cryptography options supports advanced encryption processing
- PKI services centrally manage certificates
- DataPower XI50z (in zBX) provides secure integration gateway, centralized key management and mobile access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

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

IBM Worklight Studio

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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

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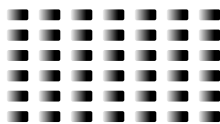
IBM MobileFirst Platform is shaping enterprise mobility

IBM MobileFirst
‹ A Smarter Planet

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**

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