The Gold Standard for Enterprise Computing

Is your Enterprise Ready for the Mobile Revolution?

Let's do a little exercise…

- … everyone please take out your cell phones

How many of you do NOT have a smartphone or smart device?

1.9B
Number of mobile phones sold in 2013

53%
of those mobile phones were smartphones

1.2B
Number of smartphones conservatively projected to be sold in 2014

(NOTE: world population is about 7.1B)

Source: Gartner

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

33.8M

Number of iPhones sold in Q4 2013

455.6M

Total number of all mobile phones sold in Q3 2013

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 is a significant component in the evolution of computing

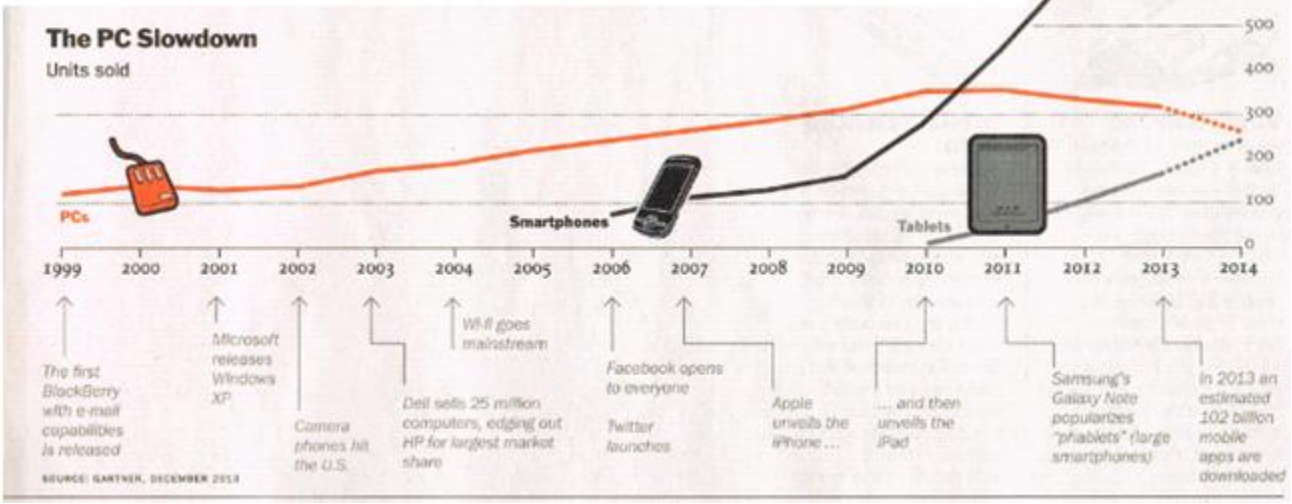
But the mobile revolution will put huge demands on business and IT – *are you ready?*

- **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

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



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

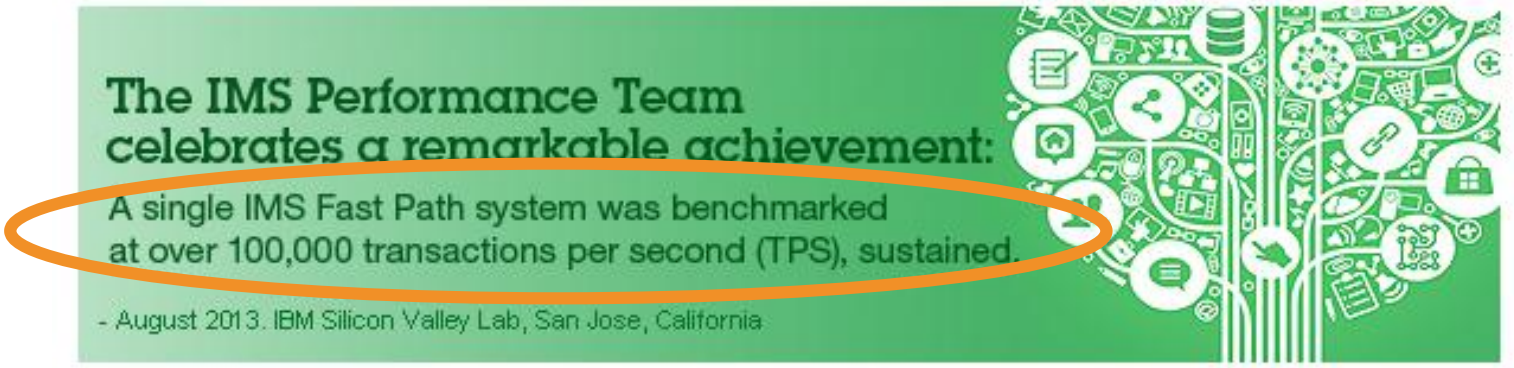
zEnterprise is the data and security “hub” of today’s enterprise businesses

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

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

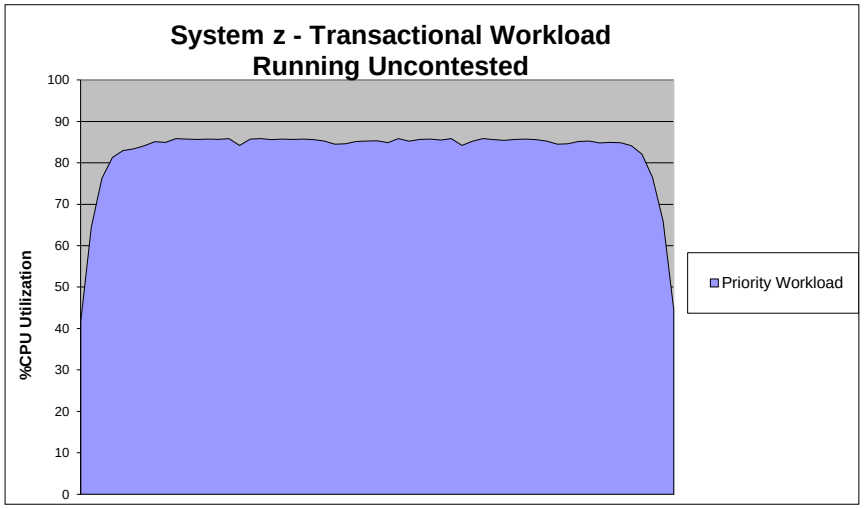


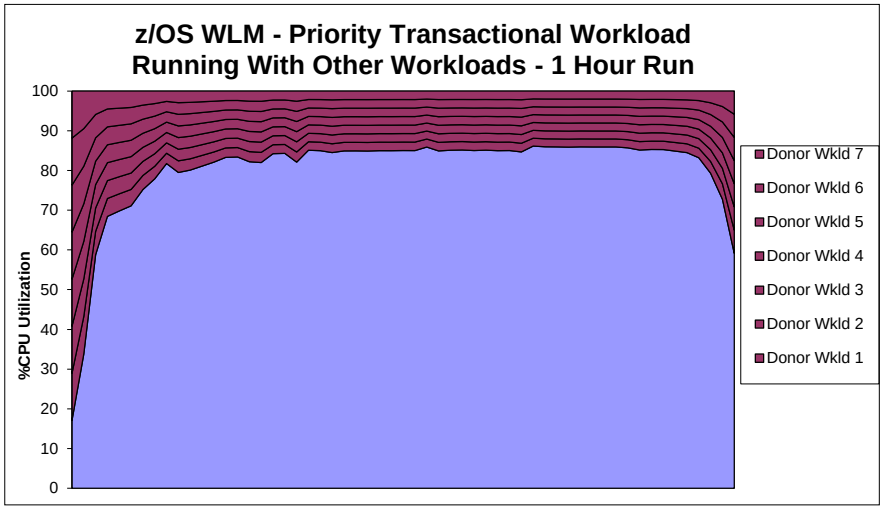
"Typically, we now process around **100 million transactions** each day, but during this year's Easter holiday, online shopping events pushed our daily transactions to a **peak of 128 million**—an increase of more than 10 percent... IBM CICS is of paramount importance to most of our clients."

- 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:

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

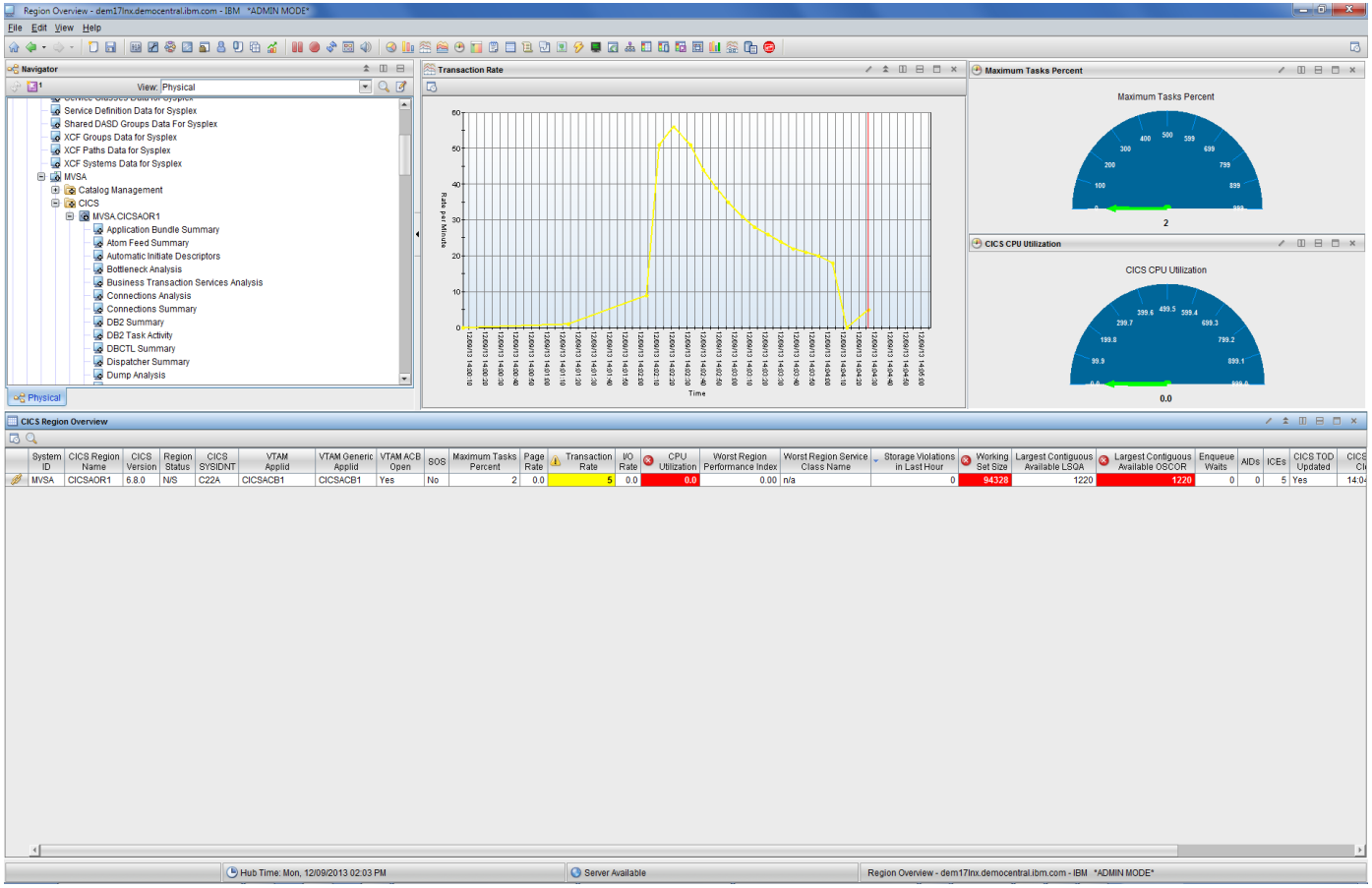
Address space management

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

Server management

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

DEMO: Perfect workload management of CICS and mobile workloads



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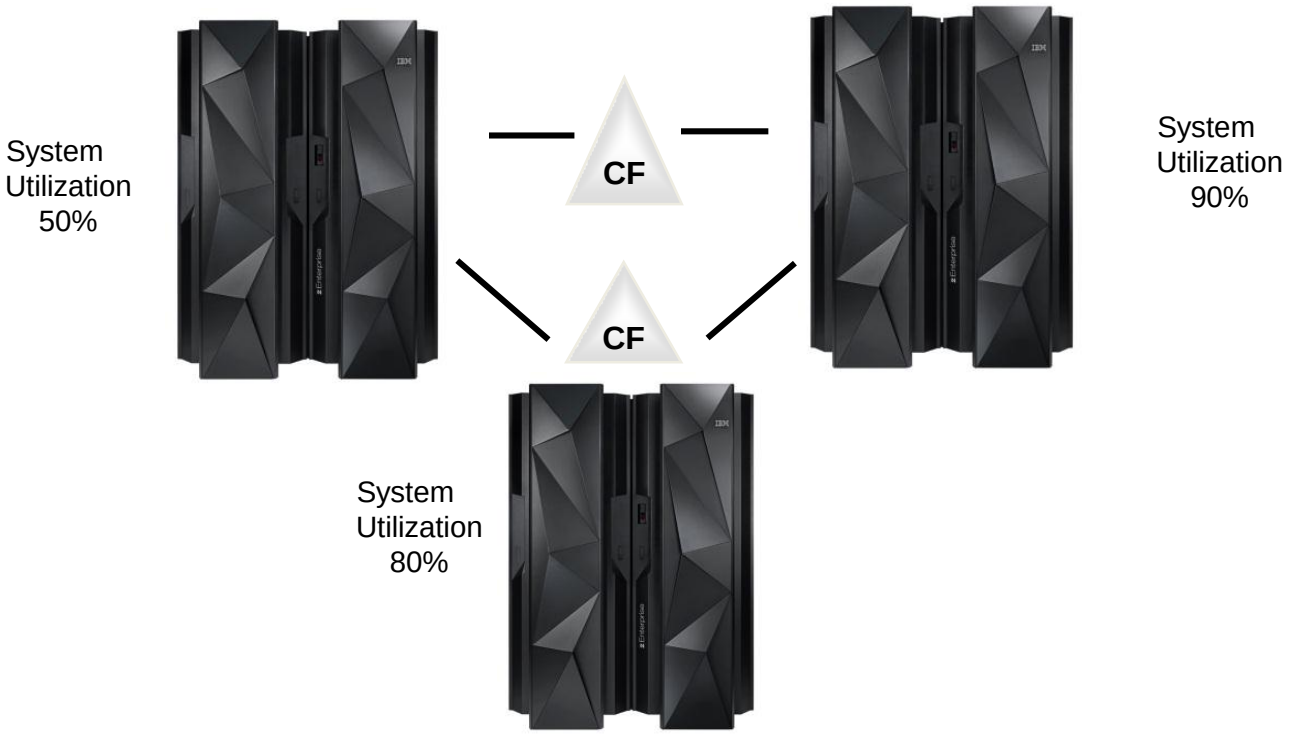
zEnterprise handles mobile's unpredictable peaks with data sharing and parallel sysplex

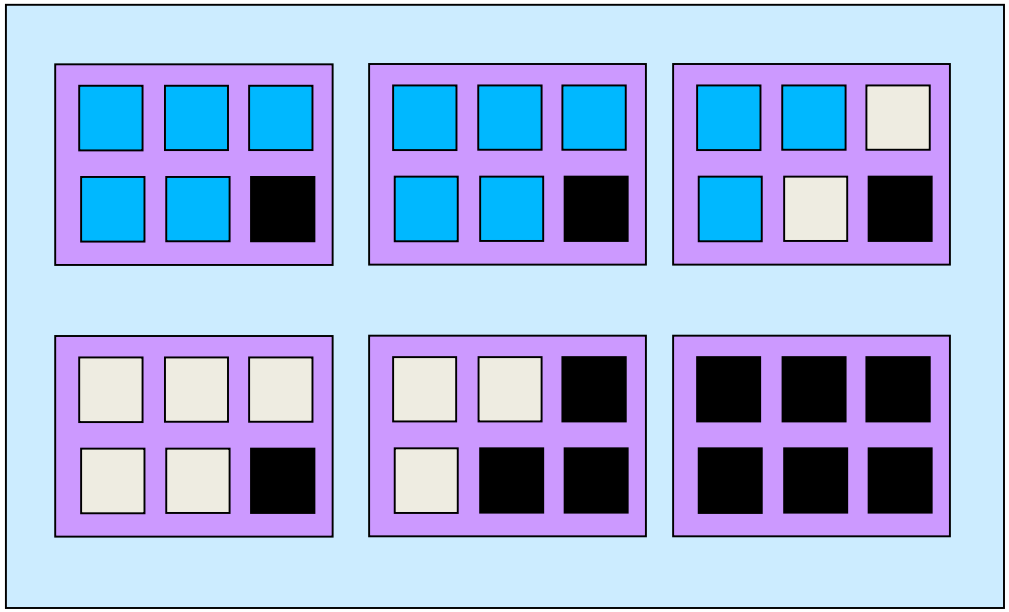


- Servers supporting mobile applications can run in a "virtual" single system
- Mobile transactions are routed to the system best able to handle the peak
- All resources are shared through the Coupling Facility (CF)
- Net result is maximized CPU utilization across several separate physical systems

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



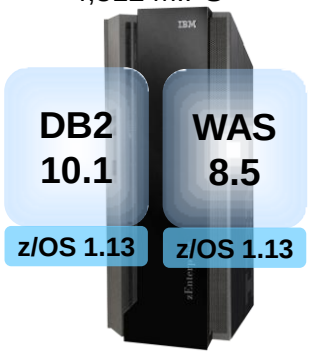
Active processors – pay full price

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

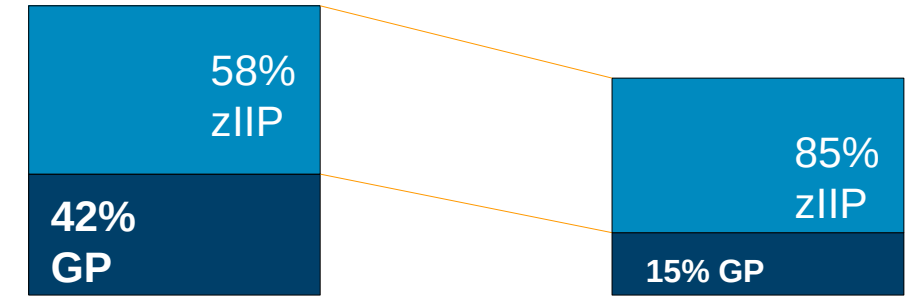
Dark processors (unused) – no charge

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

z114-X04 + 4 zIIP
4,312 MIPS



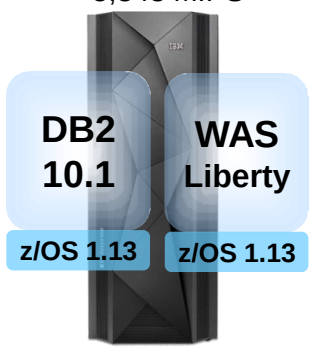
z114



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**

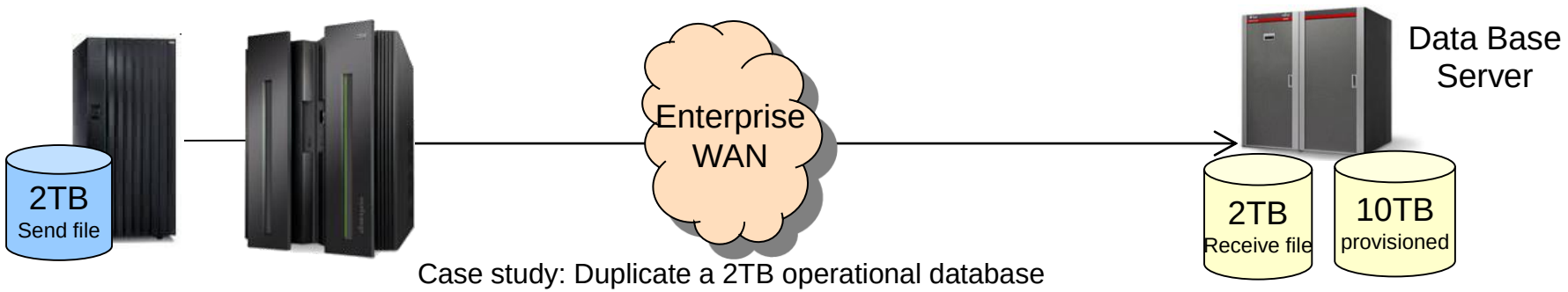
US retailers use System z

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

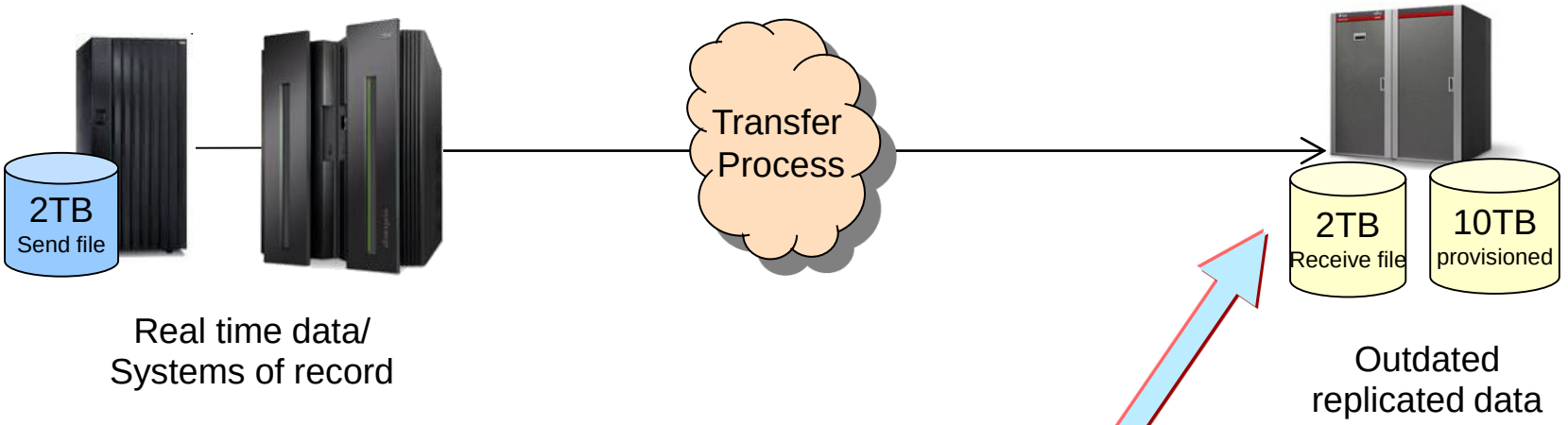
On Premises Network $0.0024/GB x 2048 GB x 4 hops x 365	$7.1K
Off Premises Network $0.29/GB x 2048 GB x 2 hops x 365	$434K

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…

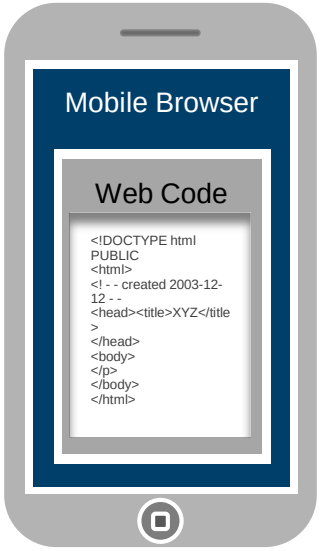
Business-critical applications and data are here…

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

Different methods exist for connecting mobile devices to business applications

Browser Access

- Written in HTML5, Java-Script and CSS3
- Quick and cheap to develop, but less powerful



Via Browser

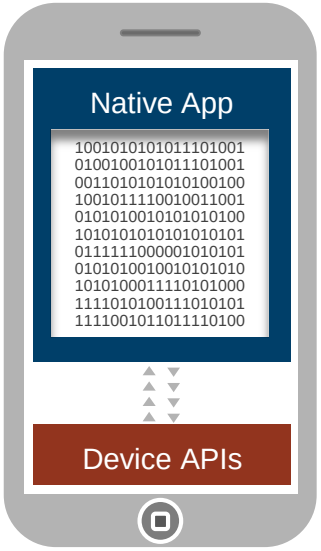
Hybrid Applications

- HTML5 and runtime libraries packaged within the app and executed natively on the device
- Sometimes augmented with native language for unique experience

Downloadable

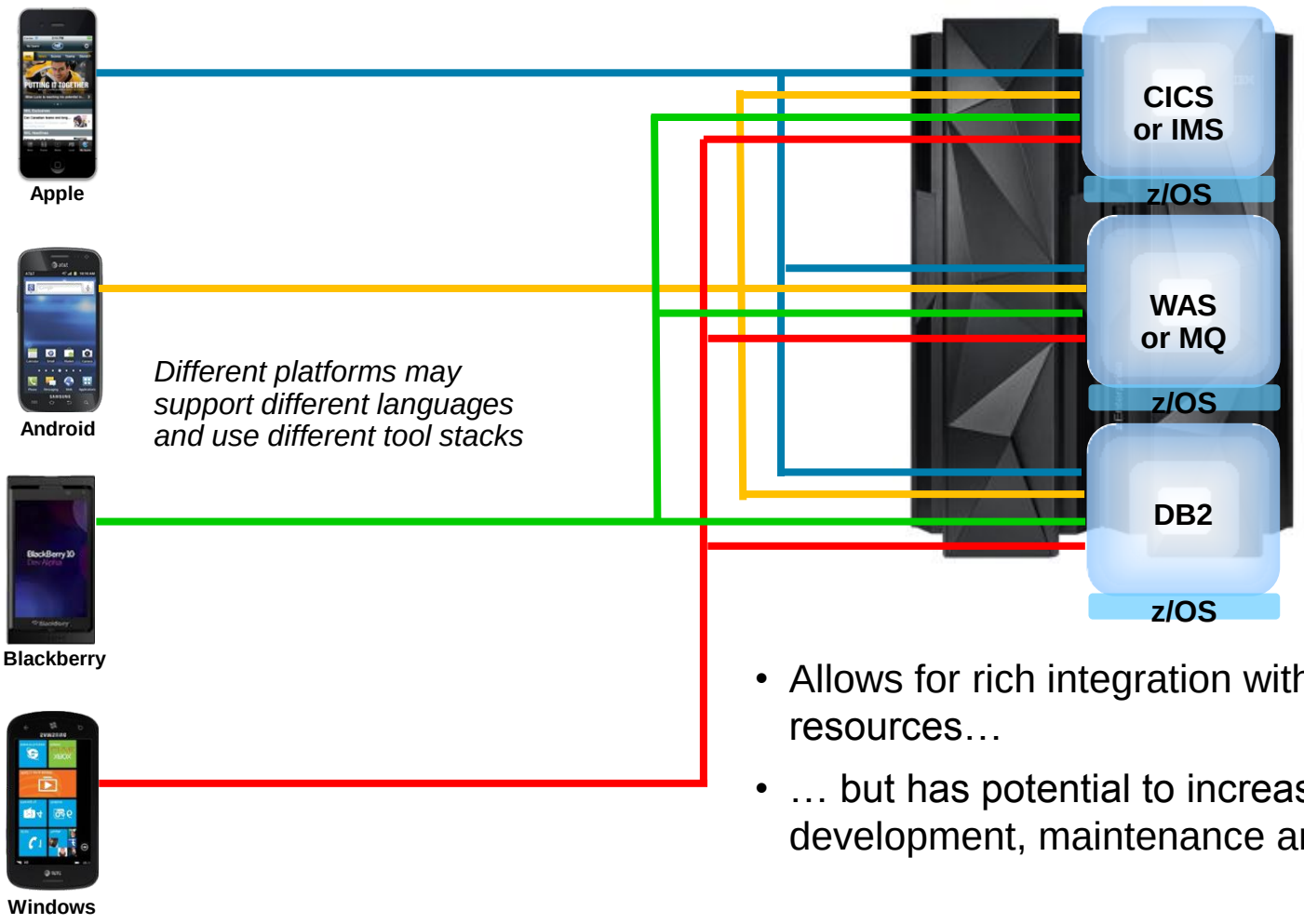
Native Applications

- Platform-specific – requires unique development expertise
- Can deliver higher user experience



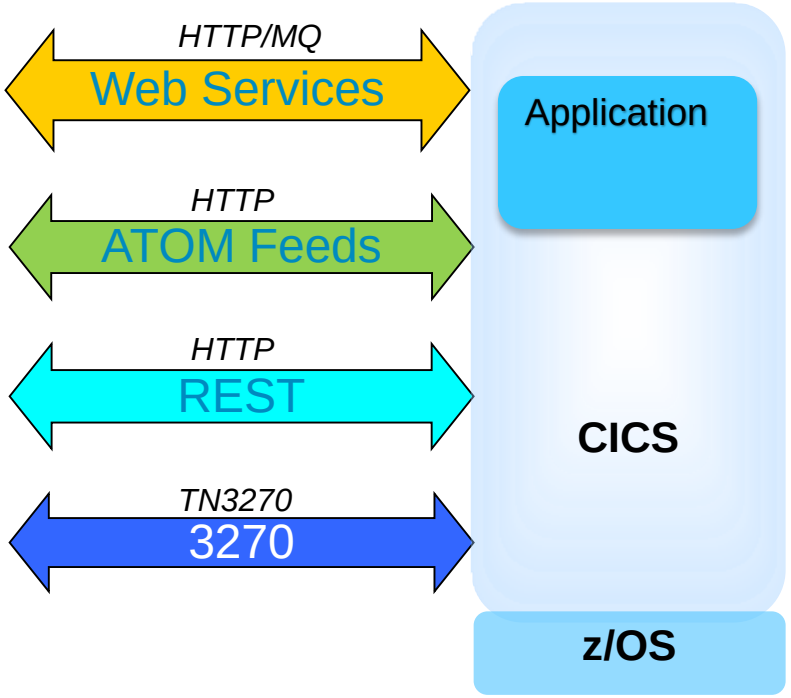
Downloadable

Unique mobile applications for each back-end business application can have advantages



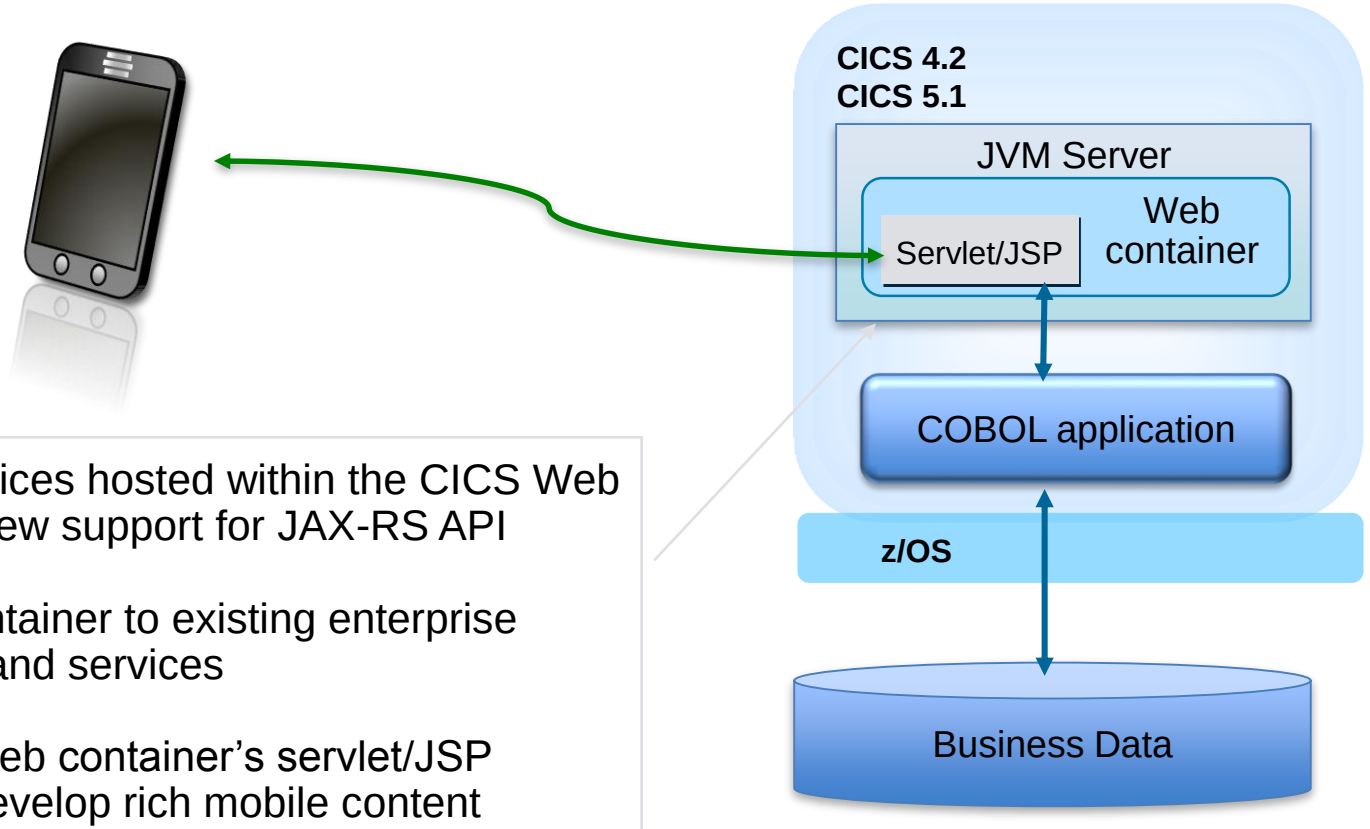
- Allows for rich integration with enterprise resources…
- … but has potential to increase costs for development, maintenance and operations

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



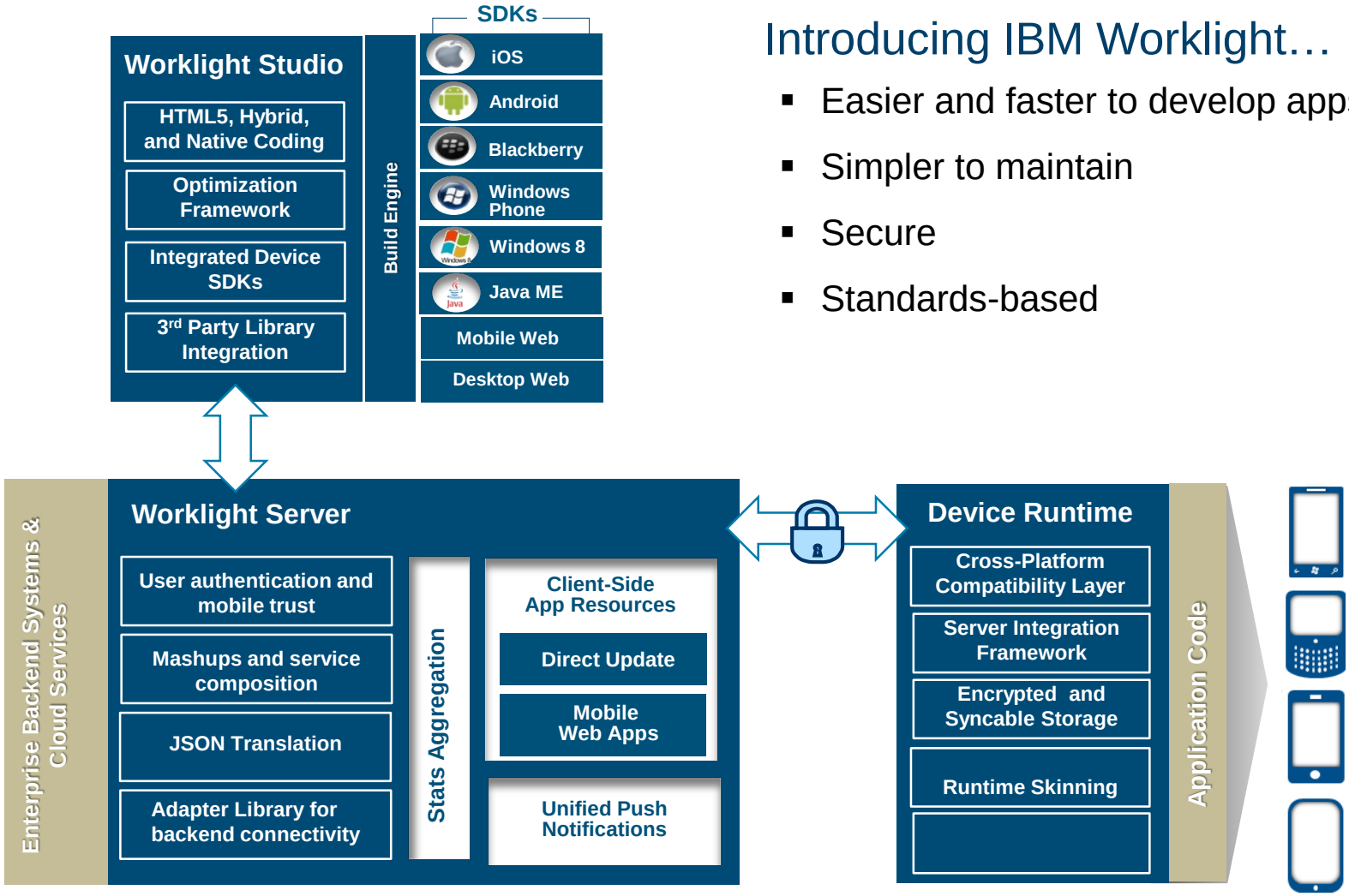
- CICS supplies necessary tools and runtime for Web Services binding, language structures and XML (available since CICS TS 3.1)
- ATOM support allows for CICS data injection in to business mashups and situational applications (available since CICS TS 4.1)
- COBOL, C/C++, PL/I and Java programs can be RESTful service providers

REST services enable CICS applications for broad mobile usage



- RESTful services hosted within the CICS Web container – new support for JAX-RS API
- Link Web container to existing enterprise applications and services
- Exploit the Web container's servlet/JSP features to develop rich mobile content

A centralized strategy for mobile services has its advantages



Introducing IBM Worklight…

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

Worklight uses a lightweight, human-readable text-based format for data

JSON – JavaScript Object Notation

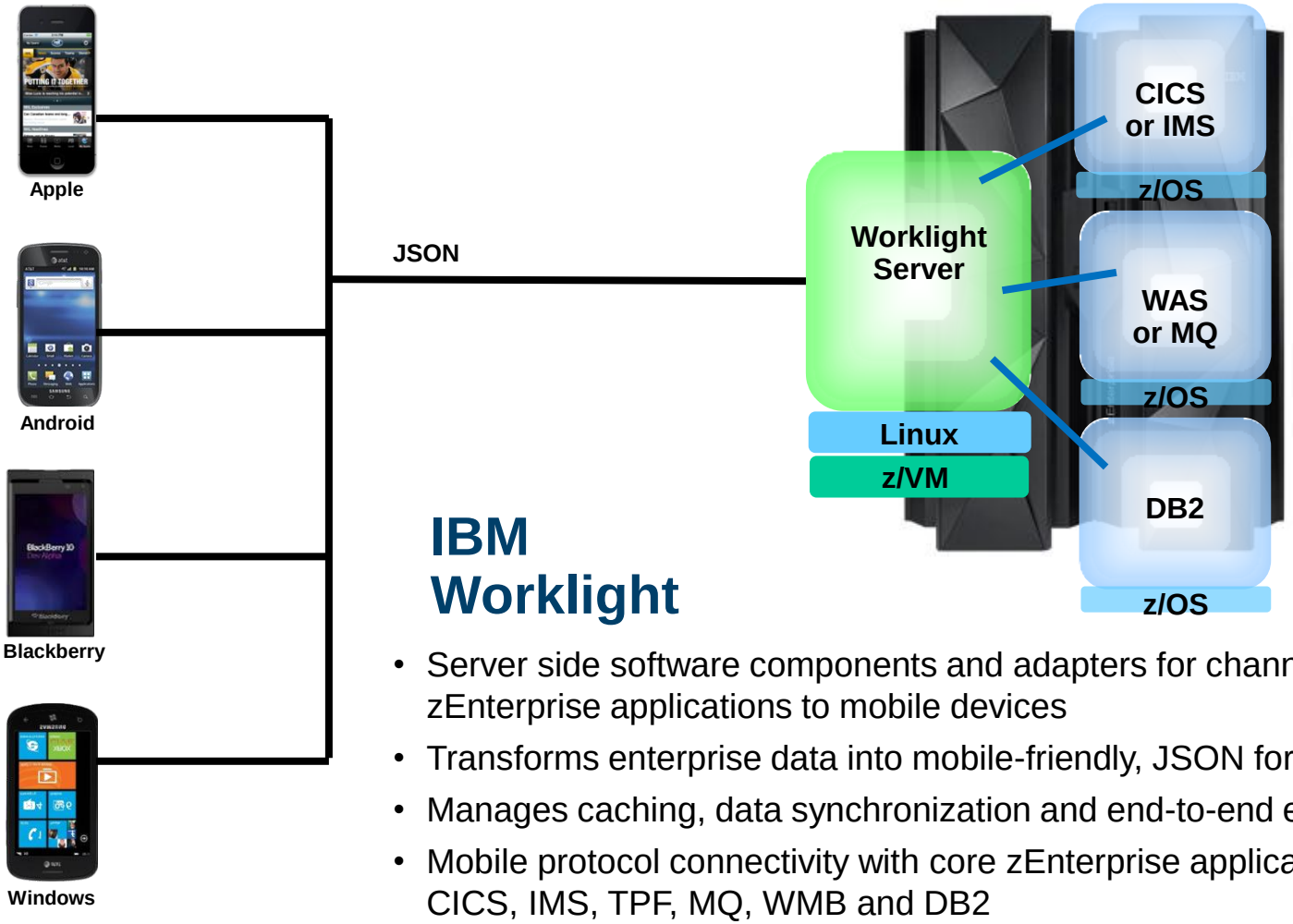
- Native JavaScript support – easy for app developers
- Simple structure – an alternative to XML – ideal for mobile transfers
- Lightweight – uses less meta-data
- Widely adopted by the industry – the mobile format of choice

```
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

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



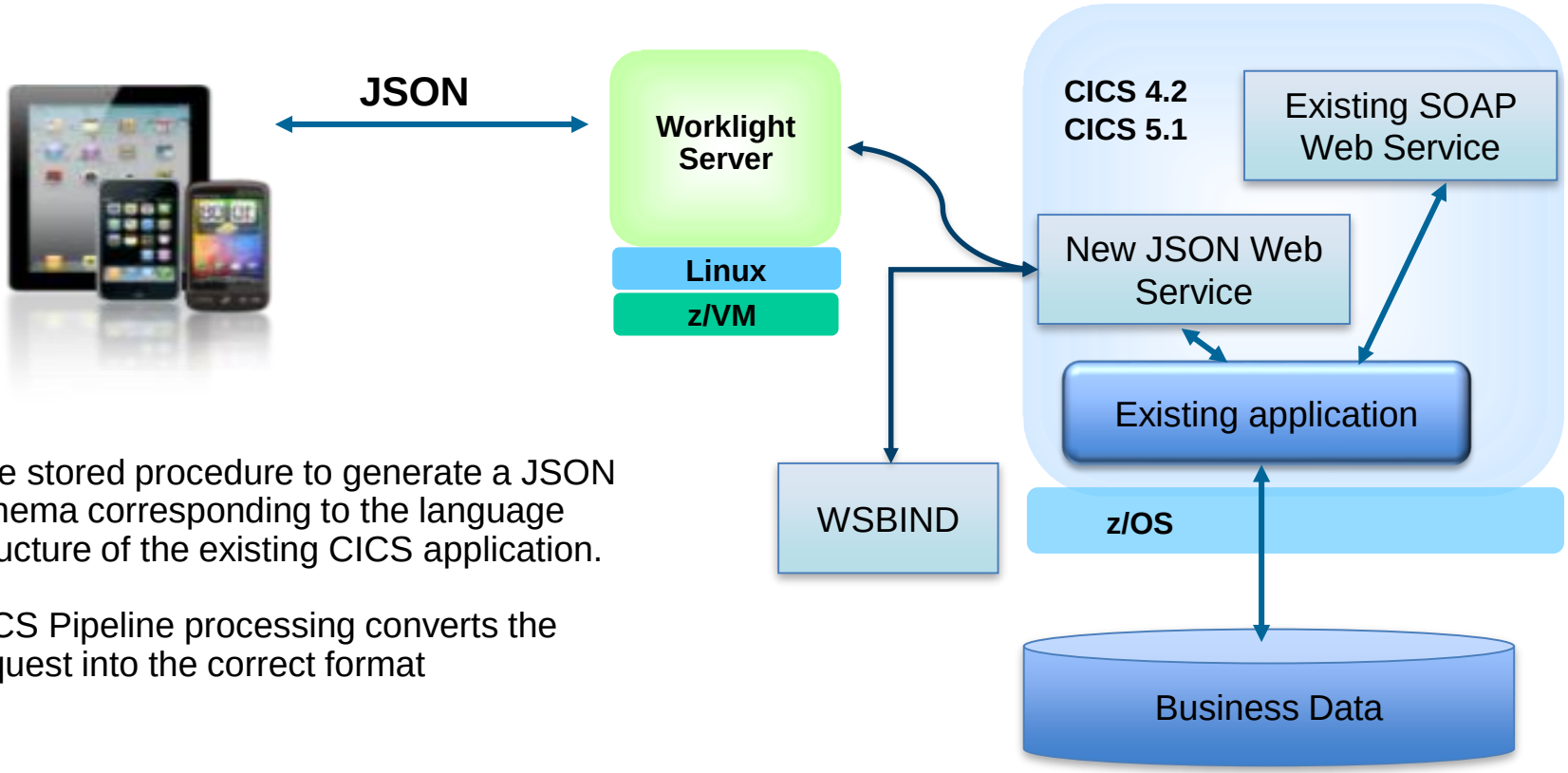
IBM Worklight

- 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

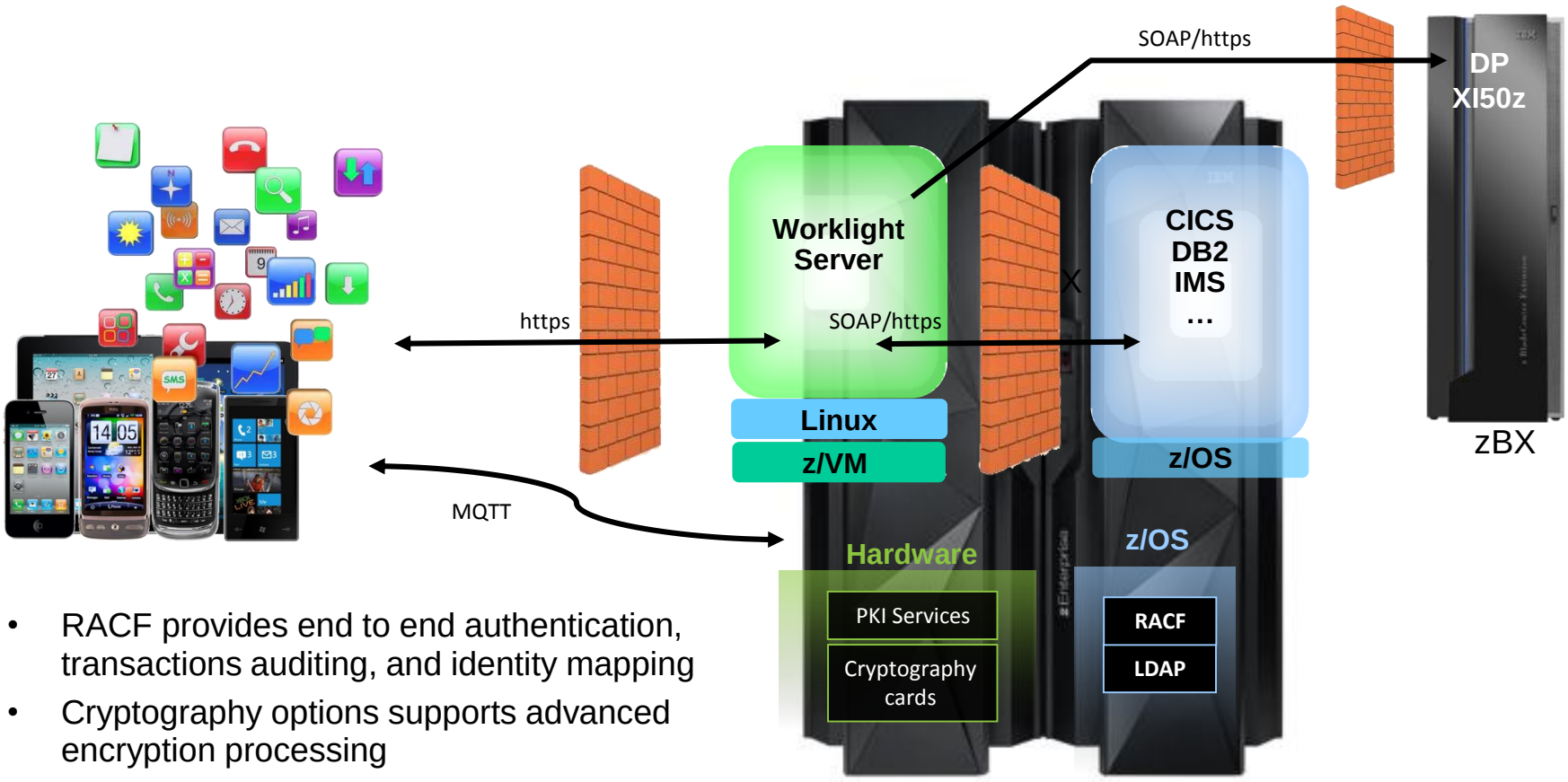


Use stored procedure to generate a JSON schema corresponding to the language structure of the existing CICS application.

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

Databases

Guardium

DB2
IMS
VSAM

Security devices
Networks
Configurations
User Activity
Threat Intelligence

QRadar

Event correlation
Activity baselining
Anomaly detection
Offense Identification

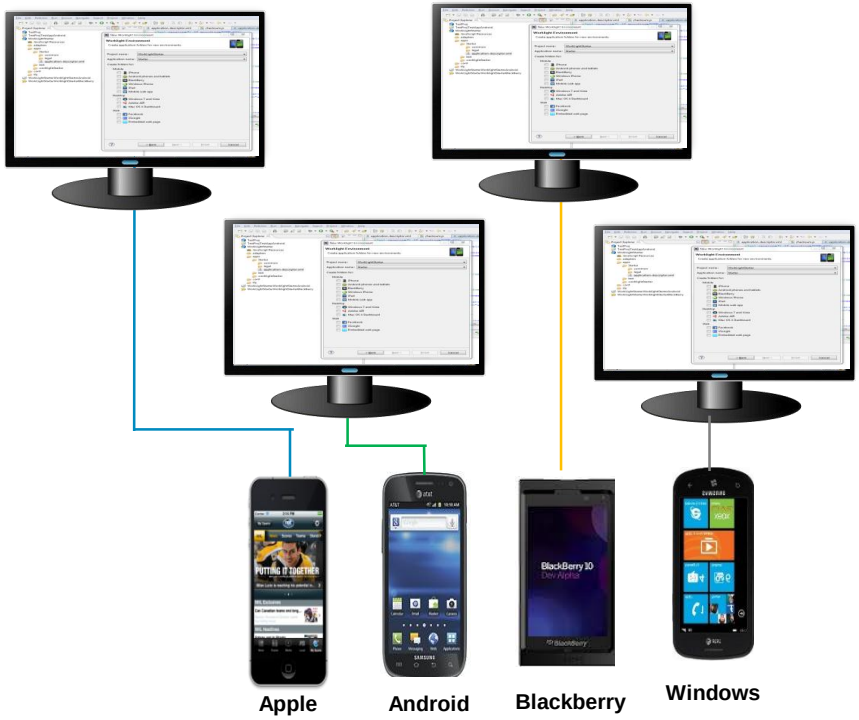
- Centralized view of mainframe and distributed network security incidents, activities and trends
- Better real-time threat identification and prioritization
- Increased accuracy and simplified compliance reporting

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

Developers create a single application that can run on any device

From the complexity of many…

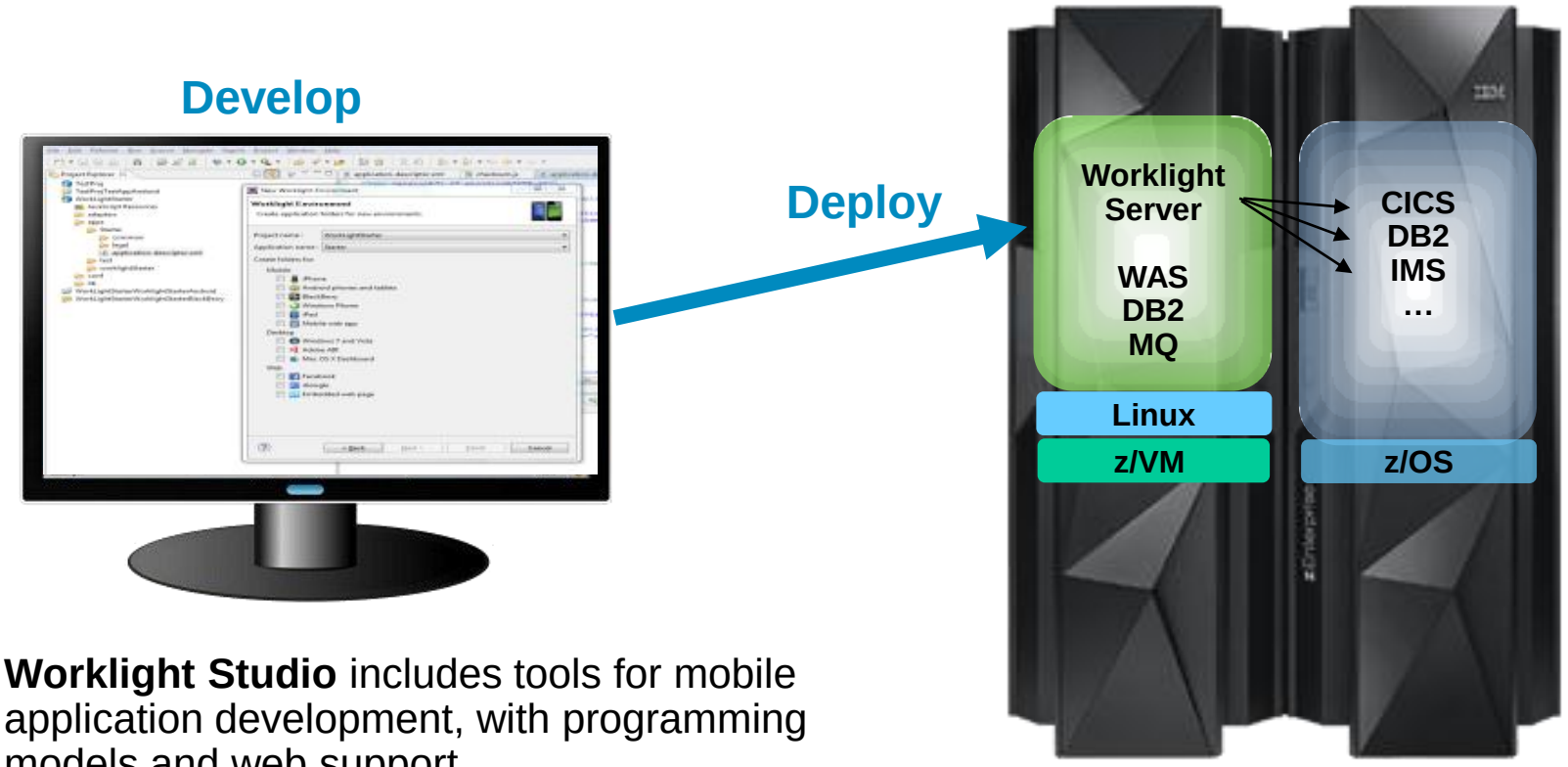
- Multiple sets of tools & frameworks
- Four codebases to develop and maintain



To the simplicity of one…

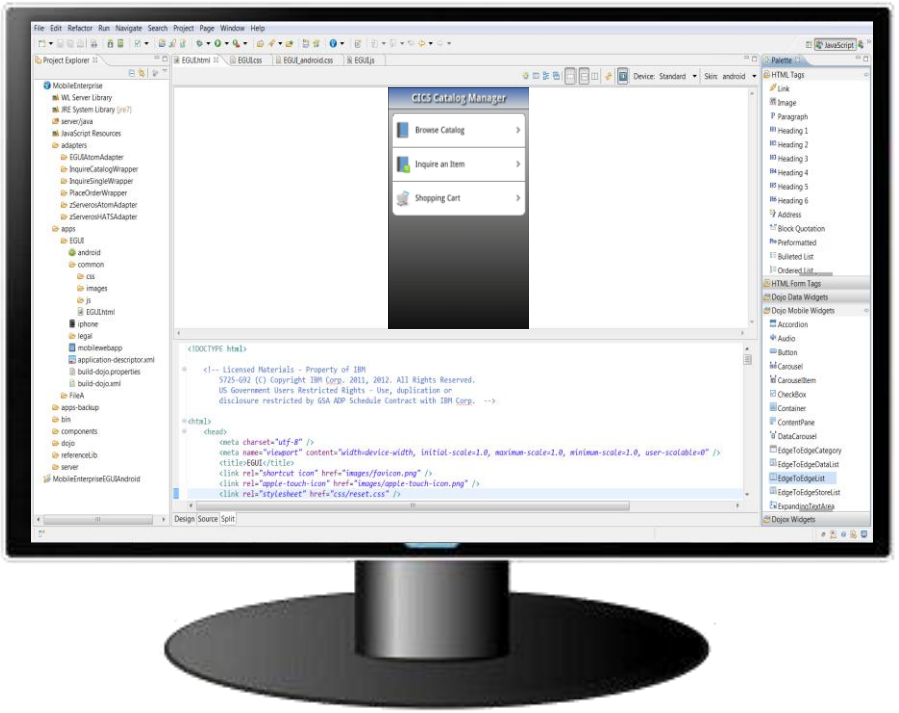
- One development environment
- One codebase to develop and maintain

Use the latest rich, graphical tools to rapidly develop mobile apps for business applications



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

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



IBM Worklight Studio

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 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 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**