SmarterComputing

Introduction to Managing Mobile Devices using Linux on System z

SHARE Pittsburgh – Session 15692

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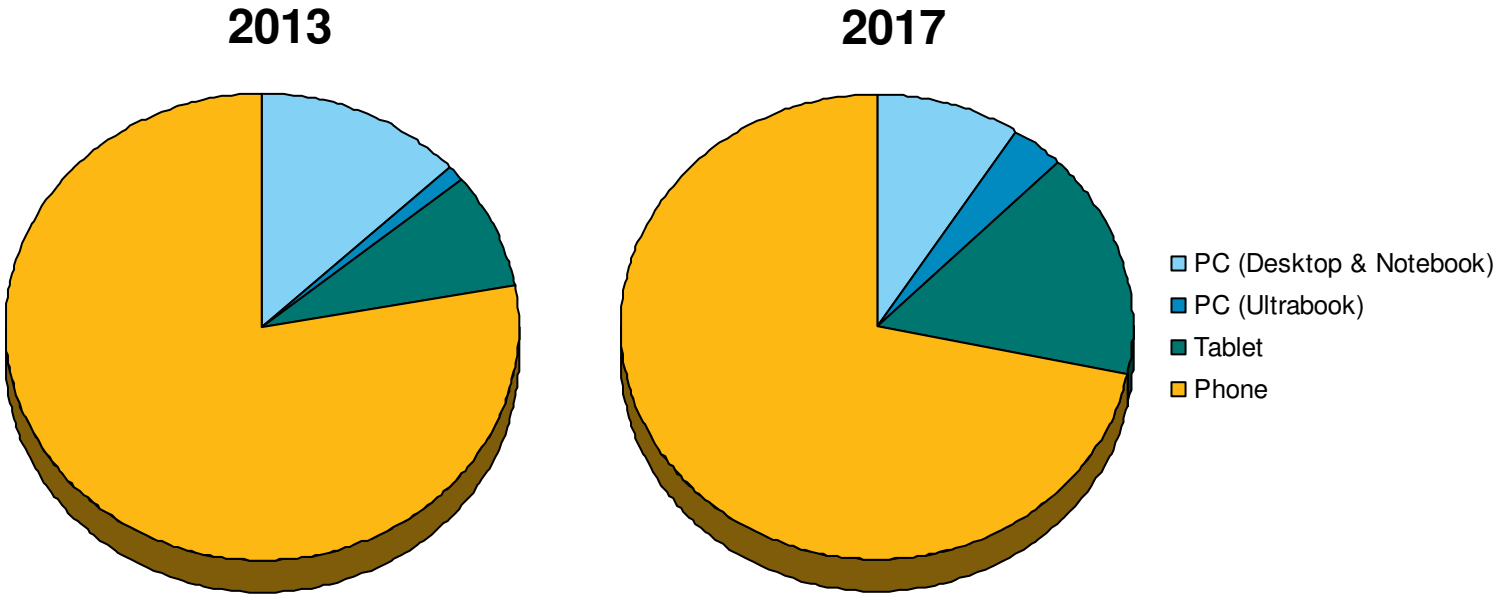
System z Architecture and Technology

Mobile devices are 80% of devices sold to access the Internet

Worldwide Shipment of Internet Access Devices



Worldwide Devices Shipments by Segment (Thousands of Units)

Device Type	2012	2013	2014	2017
PC (Desk-Based and Notebook)	341,263	315,229	302,315	271,612
PC (Ultrabooks)	9,822	23,592	38,687	96,350
Tablet	116,113	197,202	265,731	467,951
Mobile Phone	1,746,176	1,875,774	1,949,722	2,128,871
Total	**2,213,373**	**2,411,796**	**2,556,455**	**2,964,783**

Source: Gartner (April 2013)

Mobile Internet users will surpass PC internet users by 2015

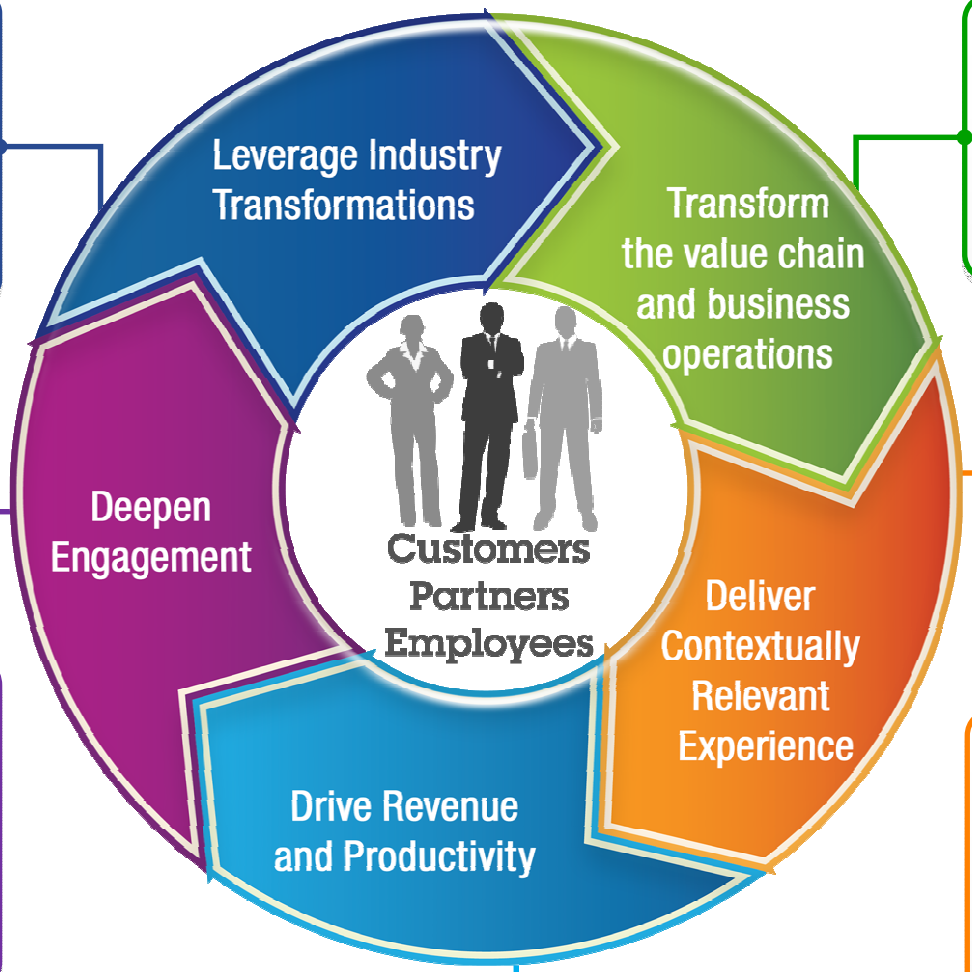
The number of people accessing the Internet from smartphones, tablets and other mobile devices will surpass the number of users connecting from a home or office computer by 2015, according to a September 2013 study by market analyst firm IDC.

PC is the new Legacy!

Five mobile trends with significant implications for the enterprise

Mobile enables the Internet of Things
Global Machine-to-machine connections will increase from 2 billion in 2011 to **18 billion** at the end of 2022

Mobile is primary
91% of mobile users keep their device within arm's reach 100% of the time



Mobile must create a continuous brand experience
90% of users use multiple screens as channels come together to create integrated experiences

Insights from mobile data provide new opportunities
75% of mobile shoppers take action after receiving a location based messages

Mobile is about transacting
96% year to year increase in mobile cyber Monday sales between 2012 and 2011

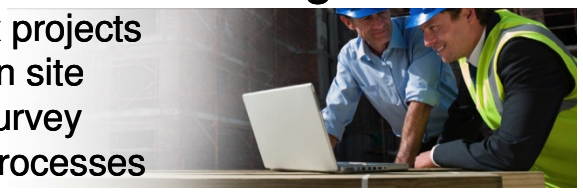
Client drivers for mobile solutions span all industries

Finance & Banking

Manage their inv
portfolios and ac
anywhere for co
transactions

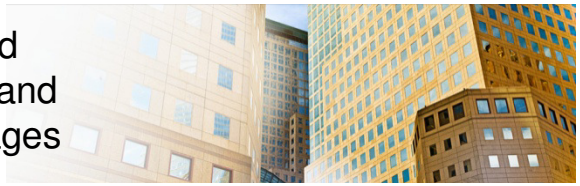
Construction & Manufacturing

Manage complex projects and operations on site and streamline survey and work order processes



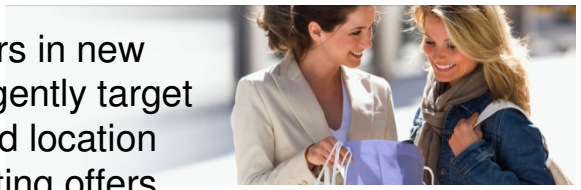
Insurance

File, process and manage claims and document damages



Retail

Engage shoppers in new ways and intelligently target personalized and location sensitive marketing offers



Travel & Transportation

Provide up to date information specific to their itineraries and location and enable customer self-service

Cross-Industry CIO's Office

Empower employees with anytime, anyplace access to dashboards and critical information

Consider the typical business traveler today…

Electronic boarding pass

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

Seating map real time

Traveler views current seat, potential upgrades, capacity of plane

Flight status real time

Traveler views potential flight delays, airport information, connecting flights, notifications pushed to device

All information on the mobile device is connected to the back end and consistent with what airline personnel see

But mobile also brings business and IT challenges

Mobile devices **are shared more often**

- Personal phones and tablets shared with family
- Enterprise tablet shared with co-workers
- Social norms of mobile apps vs. file systems

Mobile devices **have multiple personas**

- Work tool with BYOD
- Entertainment device
- Personal organization
- Security profile per persona

Mobile devices **are diverse**

- OS immaturity for enterprise mgmt
- BYOD dictates multiple OSs
- Vendor / carrier dictates multiple OS versions

Mobile devices **are used in more locations**

- A single location could offer public, private, and cell connections
- Anywhere, anytime
- Increasing reliance on enterprise WiFi

Mobile devices **prioritize the user**

- Conflicts with user experience not tolerated
- OS architecture puts the user in control
- Difficult to enforce policy, application lists

And even more challenges for the data center

18M

people use mobile devices for banking making up 8% of banking transactions

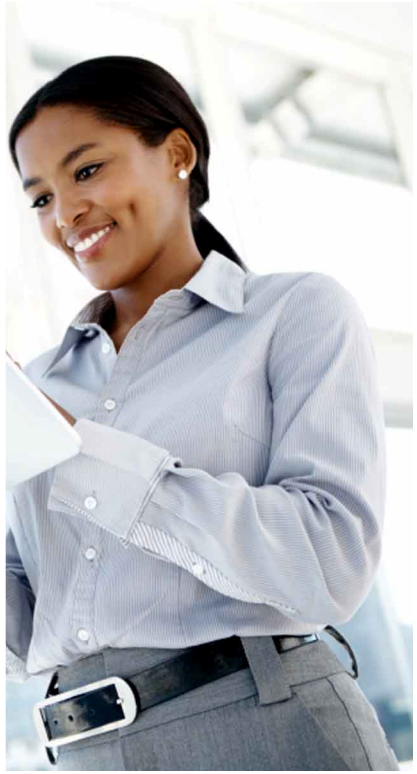
41%

IT budget is spent for mobile computing

90%

of the phones in Africa are mobile with deposit of money to mobile devices anywhere

- **Inconsistent peaks 24/7 are common**
  Peaks of data can occur any time of day as well as exploding micro activity levels and being difficult to predict
- **Increased system load**
  Increase in overall transaction rates due to ease in accessing data anytime
- **New versions of apps occur weekly vs. yearly**
  Customers 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 want the app on their device supported through non traditional methods
- **Employees are bringing their own device to work** (“BYOD”)
  200 Million employees do so today with access to confidential data
- **Security is paramount**
  Data must be secured from device to data



The IBM mobile application development lifecycle

Design & Develop
Worklight and
Rational Developer

Instrument
Tealeaf (User Experience)
Security (Fiberlink, Trusteer)

Obtain Insight
Tealeaf

Integrate
Worklight, Cast Iron

Manage
Fiberlink

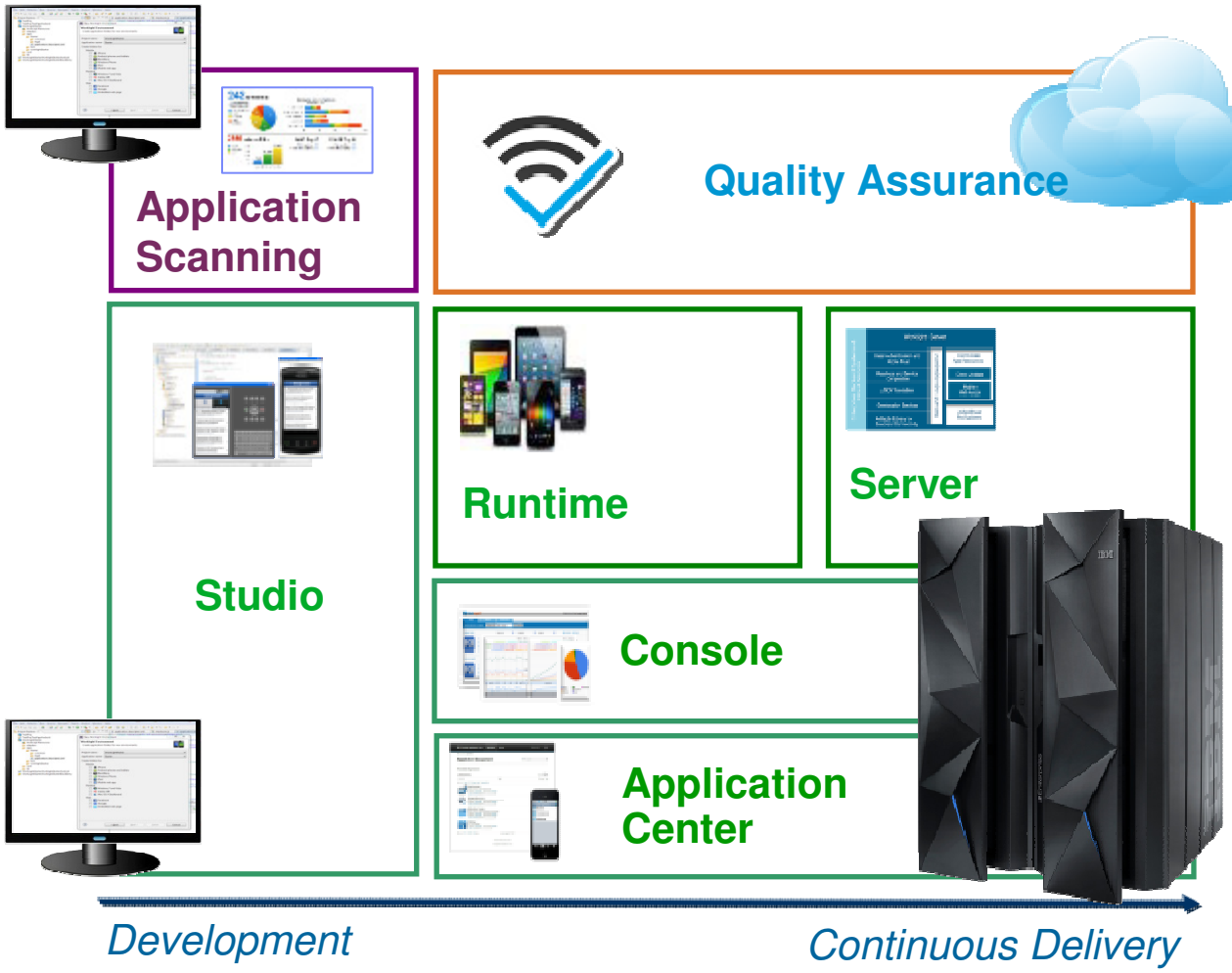
Test
Rational Test Workbench
Mobile Quality Assurance

Deploy
Worklight, UrbanCode

Scan & Certify
AppScan

The IBM Worklight Platform

Integrated mobile application development with continuous delivery



Application Scanning
Detect code vulnerabilities at the time of development

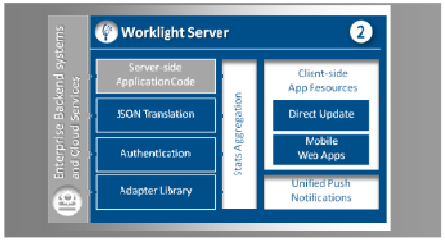
Quality Assurance
Collect beta test feedback, crashes and analyze user sentiment

Foundation
Development, Runtime, Operations Console & Private Store

IBM Worklight overview

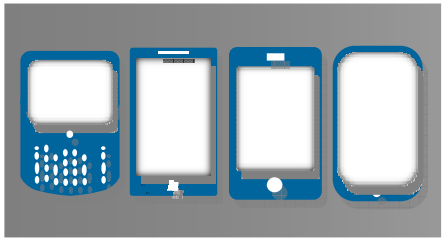
Worklight Studio

The most complete, extensible environment with maximum code reuse and per-device optimization



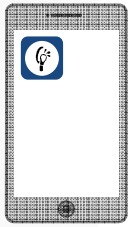
Worklight Server

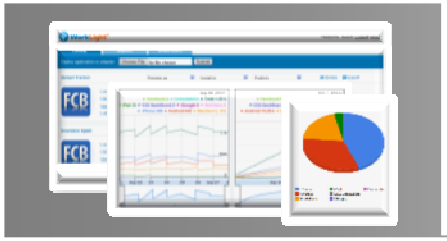
Unified notifications, runtime skins, version management, security, integration and delivery



Worklight Device Runtime Components

Extensive libraries and client APIs that expose and interface with native device functionality





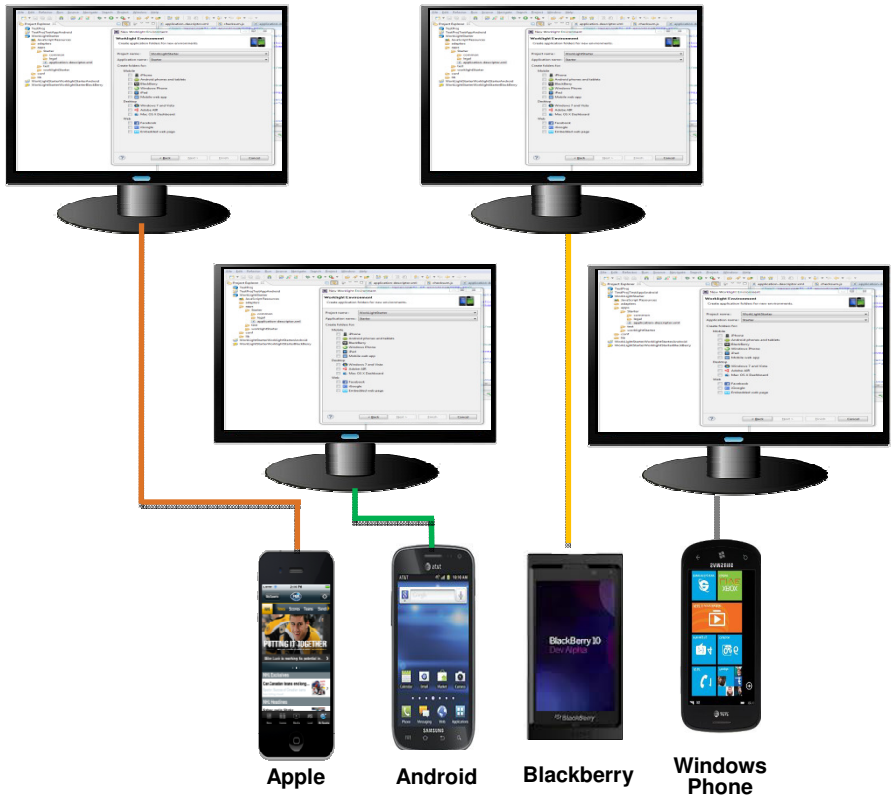
Worklight Console

A web-based console for real-time analytics and control of your mobile apps and infrastructure

Rapid multi-platform development using a single shared codebase

From the complexity of many…

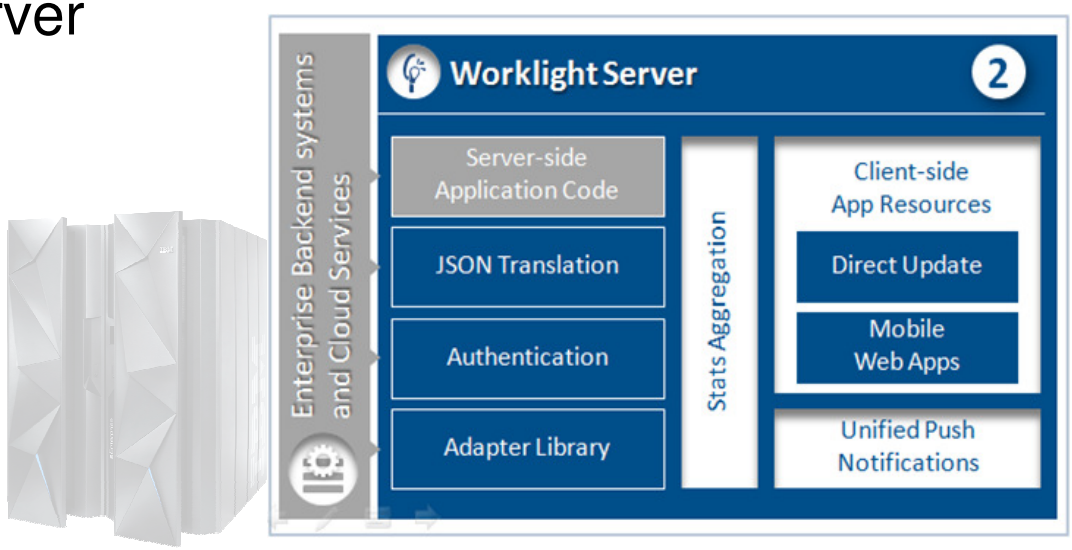
- Multiple sets of tools & frameworks
- Four codebases to develop and maintain



To the simplicity of one

- One development environment
- One codebase to develop and maintain

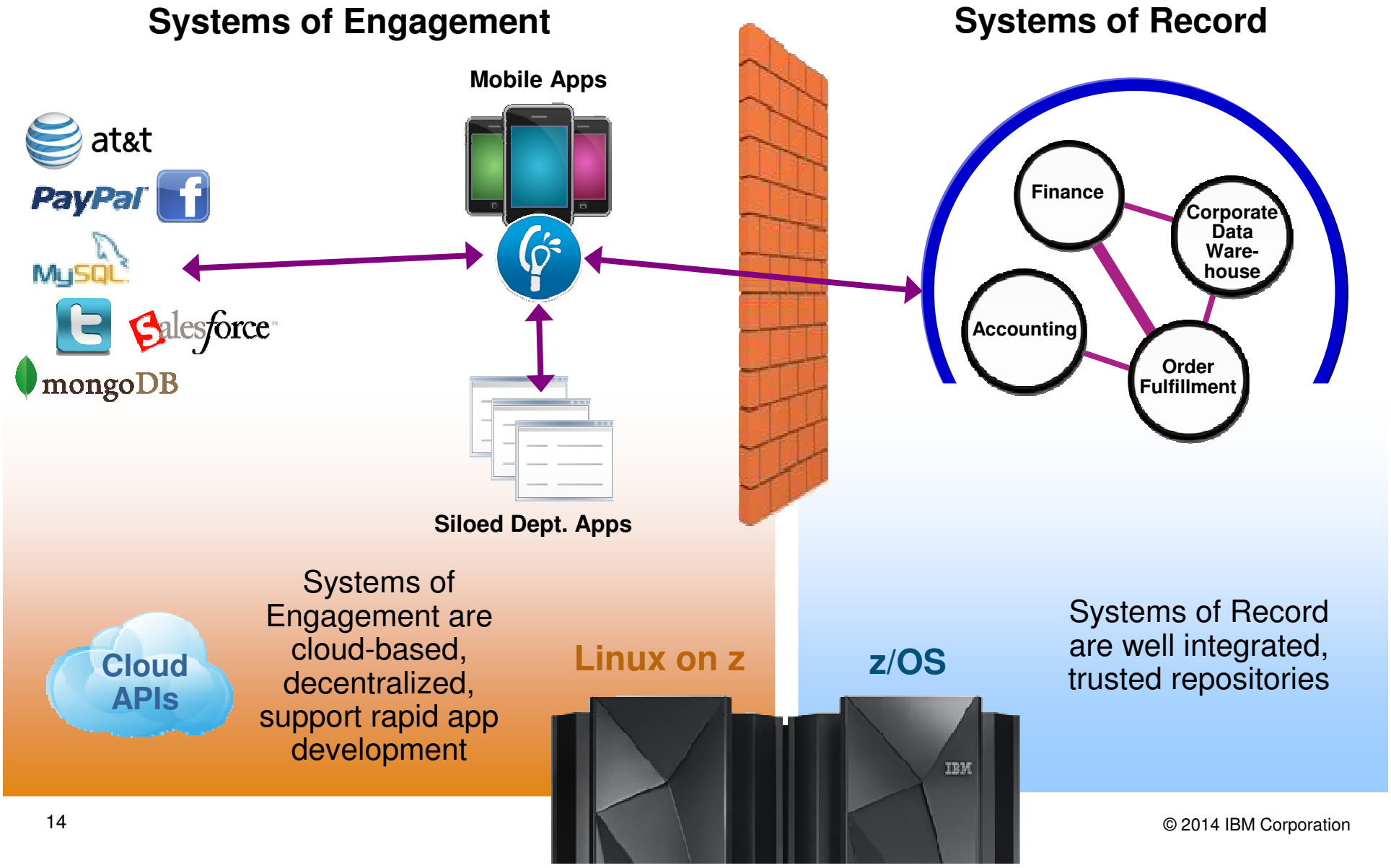
Worklight Server



Worklight Server is a **WebSphere Application Server (WAS)/Java application**, supported on **System z Linux** – WAS 7, 8, 8.5 on SLES 10, 11, and RHEL 5, 6 – providing:

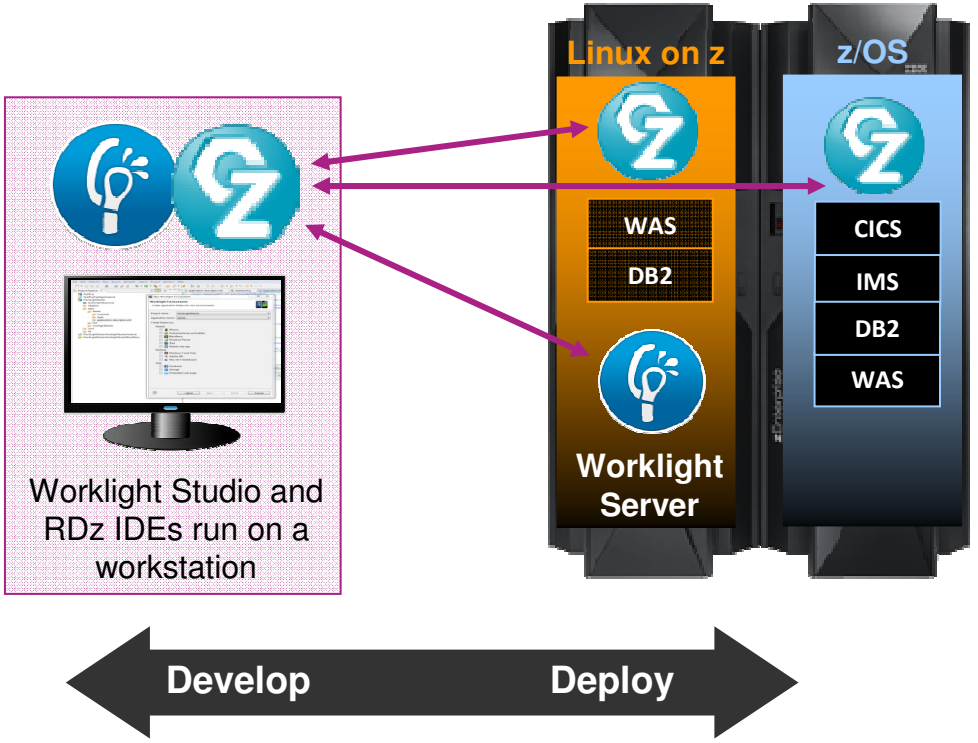
- **Adapters** to communicate with back-end services like databases, transaction systems, MQ
- **Data Transformation** - JSON is used to communicate to mobile devices – translated to HTTP or Web Services used by server components
- Server and device **Security** control
- Controls Application Deployment and **Versioning**
- **Push Notification** administration
- **Analytics** including user adoption and usage data
- An **Enterprise App Store** for your B2E applications

System z bridges Systems of Record and Systems of Engagement



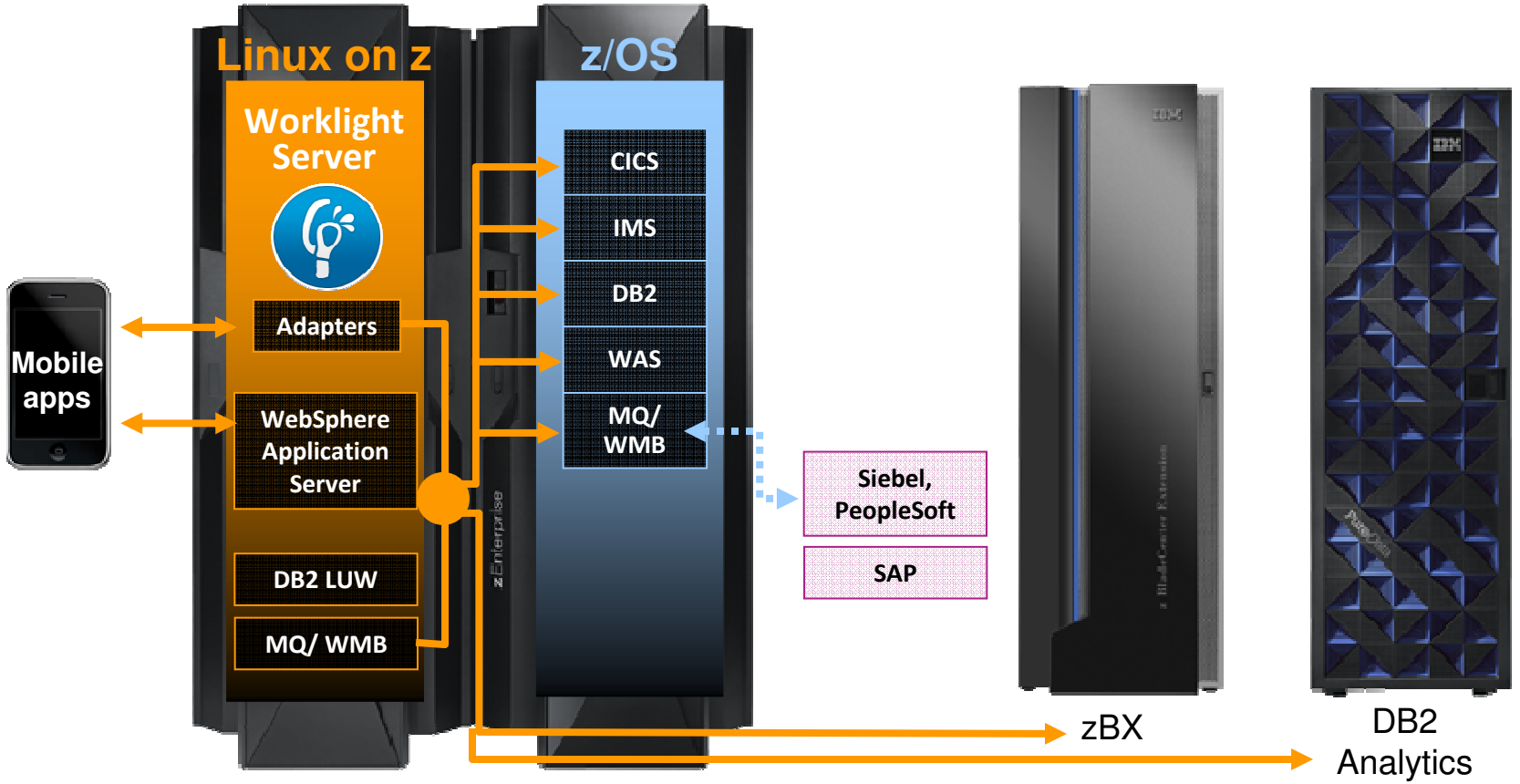
Building mobile applications on zEnterprise

- **Eclipse-based IDE for creating mobile applications** with IBM Worklight Studio integrated with Rational Developer for z (RDz)
- **Developer mobile tools with programming models** and web support with WAS Developer Tools for Eclipse (WDT)
- **Enterprise mobile application development for WebSphere** Application Server with Rational Application Developer (RAD)
- **Determine which apps need to be modified to support mobile** with Rational Asset Analyzer



IBM Worklight - an open, comprehensive and advanced mobile application platform to build, run and manage mobile applications

Connecting mobile apps on zEnterprise



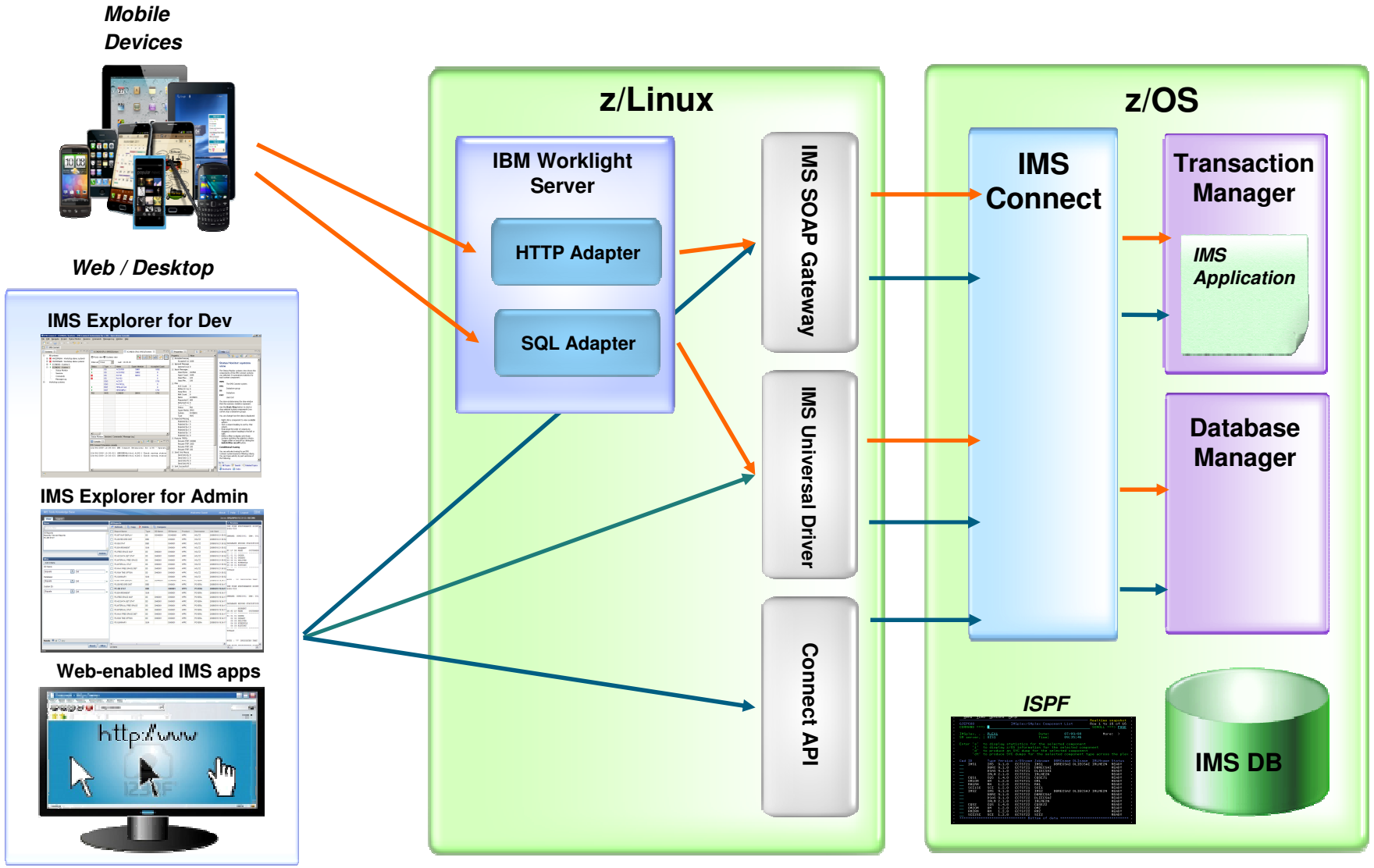
- **Server side software components and adapters for channeling System z to mobile devices** with IBM Worklight Server
- **Mobile application support** with WebSphere Application Server on System z
- **Mobile protocol connectivity with core System z applications** including CICS, IMS, TPF, MQ, WMB and DB2

CICS Mobile Demo

- Worklight on System z Linux
- Talks to CICS
- CICS sends push notifications to mobile devices
- All without changing any CICS transactions

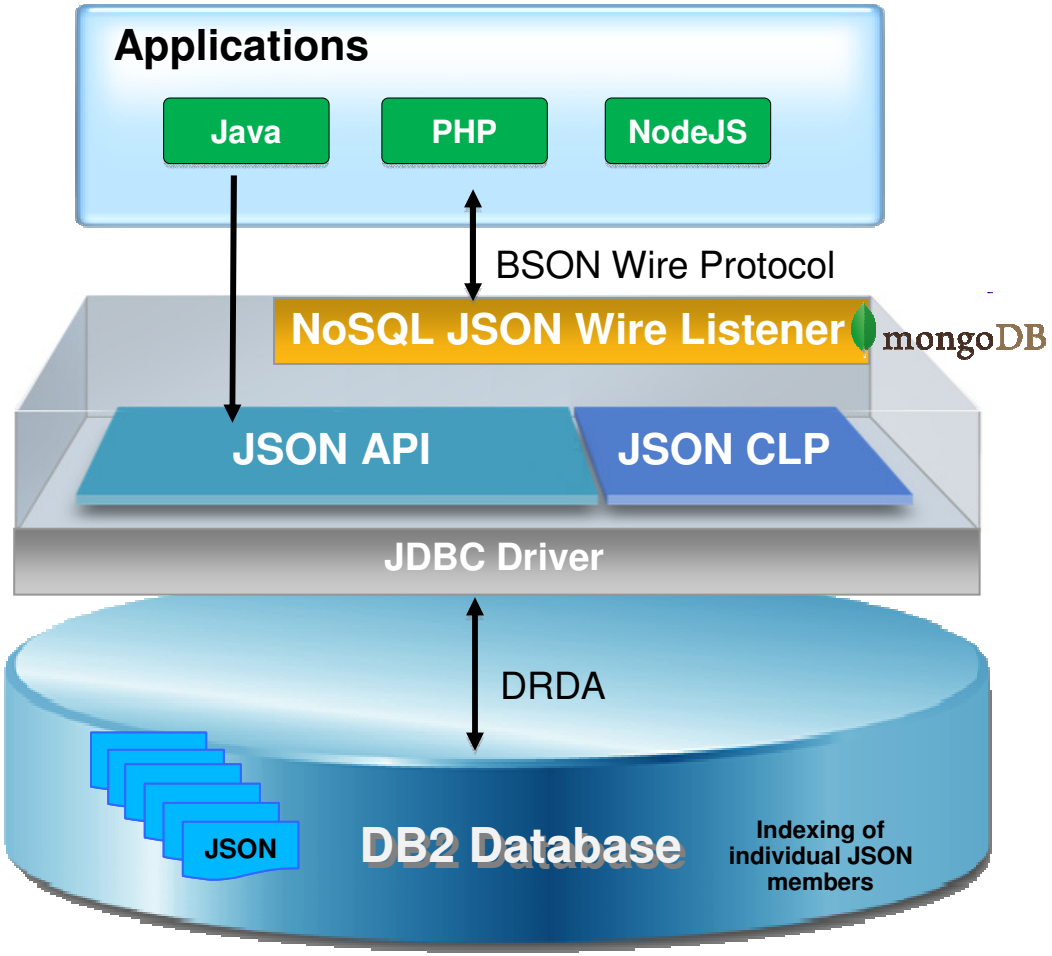
http://youtu.be/6TkQ9PzeevQ

IMS Mobile Enablement



DB2 NoSQL (MongoDB) JSON Support

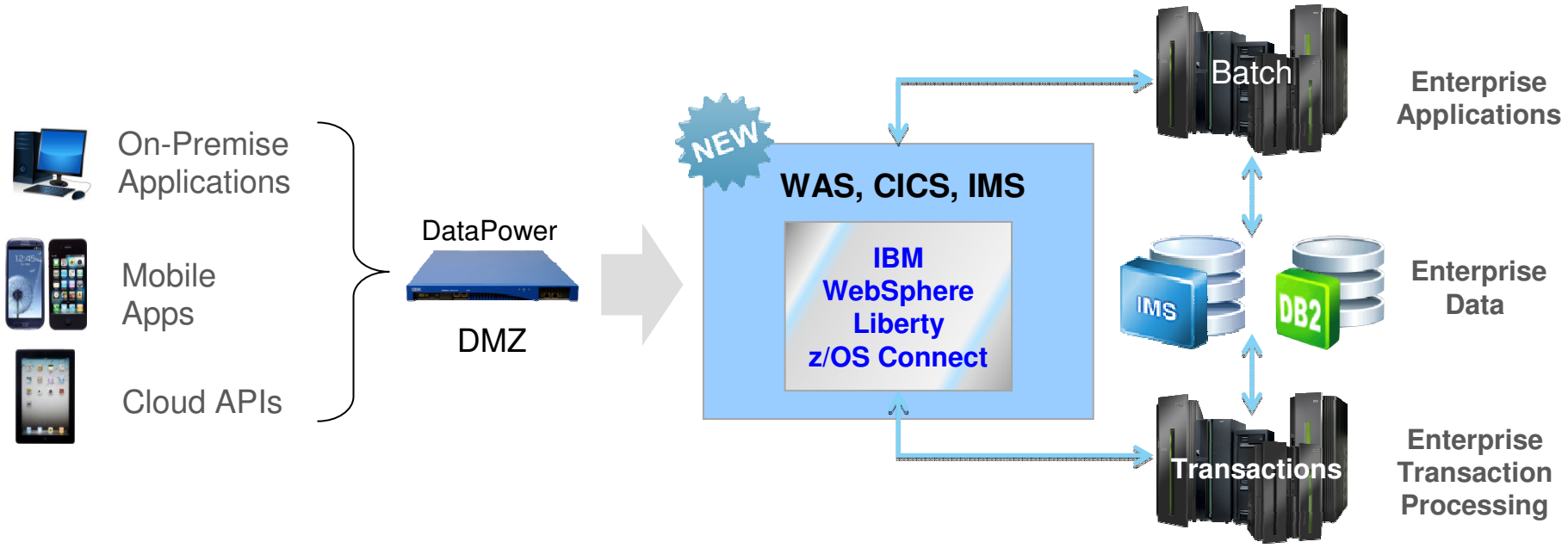
- **The best of both worlds – NoSQL agility and flexibility built on the trusted foundation of DB2**
  - Write applications using Mongo APIs to access data on DB2
  - Flexible schemas allow rapid delivery of applications
- Preserve traditional DBMS Capabilities, leverage existing skills and tools:
  - Multi-statement Transactions
  - Management/Operations
  - Security
  - Scale, performance and high availability
- Extend with advanced features (future)
  - Temporal semantics
  - Full Text search
  - Multi-collection joins
  - Combine with Enterprise RDBMS data
- Implementation leverages open source community drivers
- **Available in DB2 for z/OS V10 now**



IBM WebSphere Liberty z/OS Connect
Secure and Consistent Enterprise Connectivity for Mobile

Ships with WAS, CICS, and IMS

- **Designed for z/OS** – builds on z/OS qualities of service, auditing, chargeback.
- **Unifies connectors** – a common solution for mobile, cloud, and web
- **Simplified integration** – hides complexity of connecting to z/OS using REST
- **Discover z/OS assets** – enhances user experience by exposing z/OS data



The Mobile Security ecosystem

At the Device

Manage device
Set appropriate security policies • Register • Compliance • Wipe • Lock

Secure Data
Data separation • Leakage • Encryption

Application Security
Offline authentication • Application level controls

Mobile App

Secure Application
Utilize secure coding practices • Identify application vulnerabilities • Update applications

Integrate Securely
Secure connectivity to enterprise applications and services

Manage Applications
Manage applications and enterprise app store

Over the Network

Secure Access
Properly identify mobile users and devices • Allow or deny access • Connectivity

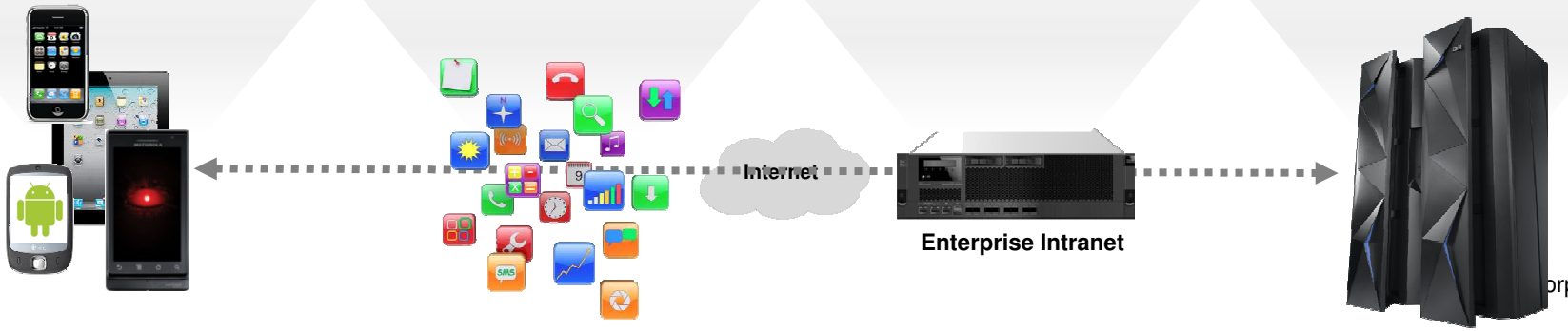
Monitor & Protect
Identify and stop mobile threats • Log network access, events, and anomalies

Secure Connectivity
Secure Connectivity from devices

Within the Enterprise

Transaction Security
Properly authenticate mobile users

Secure Connectivity
Secure Connectivity from devices



The Mobile Security ecosystem

Recommend run on z

At the Device

Endpoint Manager for Mobile

• Wipe • Lock

Trusteer

Application Security
Offline authentication

WorkLight Runtime

Mobile App

Secure Application
Utilize secure coding

AppScan for Mobile

Integrate Securely

WorkLight Server

Manage applications and enterprise app store

Over the Network

Secure Access

Access Manager for Mobile

Monitor & Protect

QRadar

anomalies

DataPower XI50z

from devices

Within the Enterprise

Transaction Security

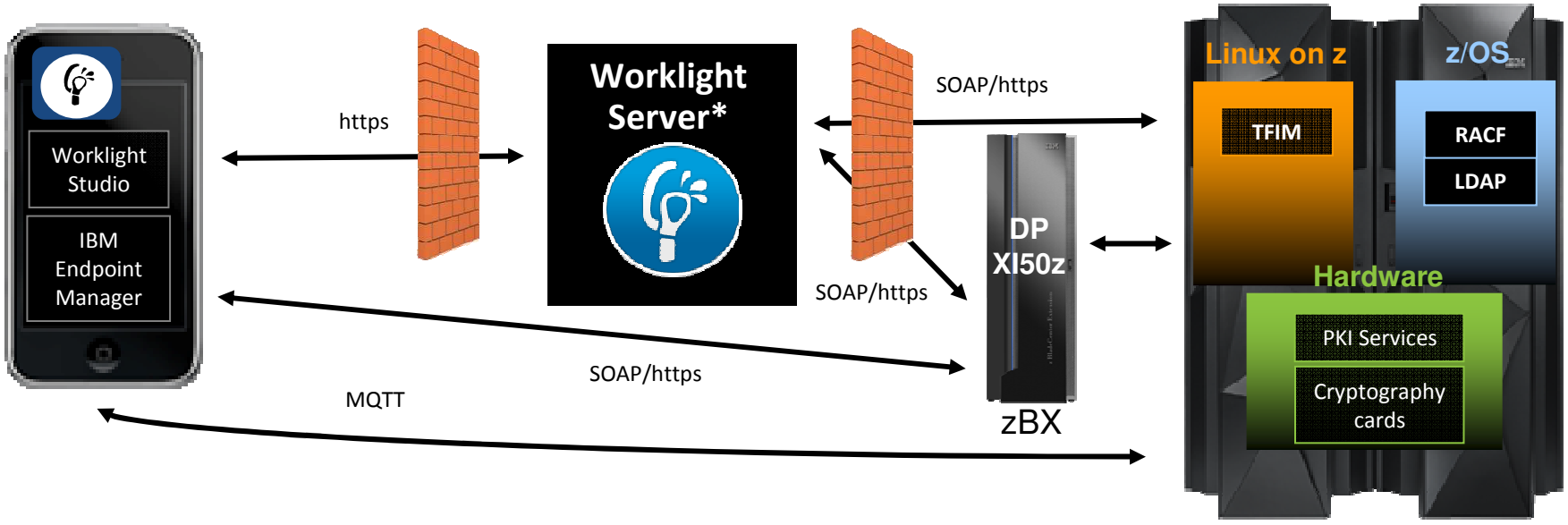
zSecure

Secure Connectivity

RACF, PKI, Hardware crypto

Enterprise Intranet

End to end security from mobile to the mainframe



- **End to end capability of mobile users identity permits, 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 Server

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

System z addresses Enterprise mobile development and delivery challenges

Fragmentation and developing for multiple mobile platforms

- Highly fragmented set of devices, platforms, languages, and tools complicates development, test, and operations

Accelerated time to market requirements

- Accelerated development demands instant provisioning of development servers
- Spikey mobile traffic demands highly scalable cloud-based infrastructures, for both SoE and SoR

Connecting apps with existing enterprise systems

- Apps typically need to leverage existing enterprise services, which must be made mobile-consumable, and remain secure
- Enterprise systems must be able to instantly provision new services and environments

IBM Worklight Studio and RDz

- Seamless integration with z data and transactions
- Device runtime provides mobile device independence

System z Scalability

- System z Linux cloud enables rapid provisioning of Worklight servers
- z/OS is the leader in transaction processing and easily scalable to handle workload increases

z/OS is mobile enabled

- z/OS subsystems are mobile-ready, with consumability enhancements planned
- End to end mobile security
- High-performance access from Linux on System z

E.Sun Bank secures IMS information for mobile banking

Meeting client demands and continually innovating

Banking information on diverse platforms

Mobile phone banking and cloud management for customers as an alternative to traditional banking

IBM Solution

WebSphere drives IMS transactions, accessing IMS and DB2 data to mobile devices

Analytics for mobile devices for deeper insights

- **Analyze mobile user behaviors** with Tealeaf
  - Automatically instrumented in IBM Worklight mobile apps
  - Capture and high-fidelity replay of mobile gestures on iOS and Android-based devices

- **Sophisticated dashboards and reports on mobile device** with Cognos Mobile
  - Rich, interactive BI interface.
  - Real-time monitoring, GPS integration and downloadable, offline reports
  - Security protocols protect sensitive and proprietary business information

First National Bank (FNB)

Achieving sub-second response for hundreds of millions of monthly transactions on the mainframe
Mobile and IMS

The need:

The ubiquity and convenience of cellphones and tablets as computing devices represented a clear growth opportunity for FNB; in South Africa, more people have cellphones and smart mobile devices than bank accounts. FNB wanted to launch a reliable, secure and highly responsive mobile channel before its competitors, and looked for a platform that would enable very short time-to-market.

The solution:

FNB integrated a new Java-based mobile front-end directly with tried-and-trusted business logic and core banking services running on IBM® Information Management System (IMS™) on an IBM zEnterprise® EC12 server. IBM IMS Enterprise Suite Connect APIs for Java and C and IBM IMS Enterprise Suite SOAP Gateway manage links between the channel applications and core functionality and data on the mainframe.

The benefit:

- Rapid deployment enabled FNB to gain first-mover advantage in the market, gaining the number one spot for mobile banking
- Ultra-low average end-to-end response times of 30 milliseconds ensure snappy performance for mobile banking users
- Fast, secure and reliable mobile banking generates more business for FNB and reduces its average cost per transaction

"We don't start from the premise that the mainframe is best; rather, we look at the requirements—big data, huge numbers of concurrent processes, high performance, high scalability, high security—and then look at what technology can deliver all of those things. The answer is IBM zEnterprise and IMS."

—Jay Prag, CIO – Hogan Channels, FNB

Solution components:

- IBM® zEnterprise® EC12
- IBM z/OS®

ZSP03833-USEN-00

Rizal Commercial Banking Corp. transforms IT to gain 1.2M customers in one year

The need:

RCBC needed an IT infrastructure to support a core-banking system, called Finacle, from IBM Business Partner Infosys Ltd. that would help the bank improve efficiency, launch products faster and attain 10 million customers

The solution:

An IBM® z10™ Enterprise Class platform and a range of IBM middleware products provide scalability, security and consistent performance at the high levels required by Infosys and RCBC, enabling new applications like mobile banking and "MyWallet"

The benefit:

- Reduces new product launch times by 50 percent
- Helps the bank outpace the competition by an estimated two to three years on new product development
- Supports exponential customer growth through the scalability of the IBM System z platform

"The combination of Finacle and IBM gives us the functionality we want on a high-performance platform that is robust and resilient enough to handle the bank's requirements moving forward."

—Dennis Bancod, senior executive vice president and head for IT and operations,

Solution components:

- IBM® DB2® for z/OS
- IBM Rational® Build Forge® Enterprise Edition
- IBM Rational Team Concert™

ZSP03733-USEN-01

Large International Grocery retailer
Gets 16-day ROI for Worklight on System z mobile solution with CICS

Mobile and CICS

The need:

This company differentiates itself by its network of distribution centers, which use advanced technology to support a modern, efficient and cost-effective supply chain. Distribution center managers had to access this system from a terminal in an office, and then make a number of journeys across the massive facilities to work with their teams in the fulfillment process, and do so without real-time access to data.

The solution:

Worklight on Linux on System z – used existing CICS transactions -- allowed the distribution center managers to access warehouse information on a mobile device, accessible at all 25 centers and throughout each 500,000 square foot facility. With the IBM Worklight solution on Linux on System z, managers will now have contextual data in an easy-to-read, mobile-rendered format, and be able to make accurate deployment decisions with real-time data as they move through the facilities.

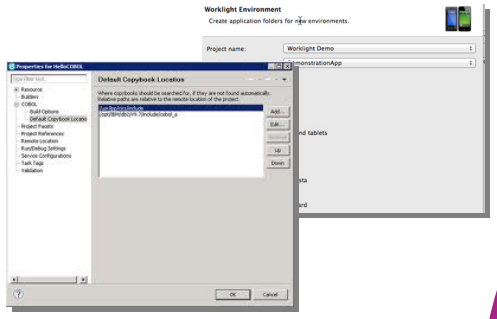
Solution components:

- IBM Worklight for Linux on System z
- IBM zEnterprise 196

The benefit:

- The indicative results of the POC demonstrated cost savings of about $2.45 million per year, which equated to an approximate return on investment of only 16 days.

Mobile and cloud with zEnterprise



System z applications

Core CICS, IMS, DB2 and other applications and databases cloud and mobile ready

Mobile Devices

developed for the Cloud through web-based shared applications using Worklight

Infrastructure

Cloud orchestration, provisioning and automation with Tivoli solutions

System z service management extending to mobile

- **Network visibility and management important to keeping mobile apps available and performing**
  - OMEGAMON for Mainframe Networks
- **Mobile as an extension of Cloud**
  - Requires end-to-end asset management of mobile applications across distributed and System z
- **Dynamic nature of Mobile drives critical requirement for enhanced automation**
  - 24/7 availability requires high degree of mainframe System and Workload Automation

Mobile Workload Pricing for z/OS

- **Benefits**
  - Improves the cost of growth for mobile transactions processed in System z environments such as CICS, IMS, DB2, and WAS
  - Enhances Sub-Capacity pricing
    - Mitigates the effect on MLC charges when higher transaction volumes due to mobile cause a spike in machine utilization
    - Normalizes the rate of transaction growth
  - No infrastructure changes required, no separate LPARs needed
    - Enhanced way of reporting sub-capacity MSUs
    - System runs as it always has, workload execution is not altered
- **Key requirements**
  - Available to all enterprises running a zEC12 or zBC12 server (actual mobile work may run on any zEnterprise machine including z196 and z114)
  - Use a Mobile Workload Pricing Defining Program to process mobile transactions
  - Implement sub-capacity using AWLC or AEWLC under standard pricing terms
  - Meet the mobile workload tracking and reporting requirements

Why System z and mobile?

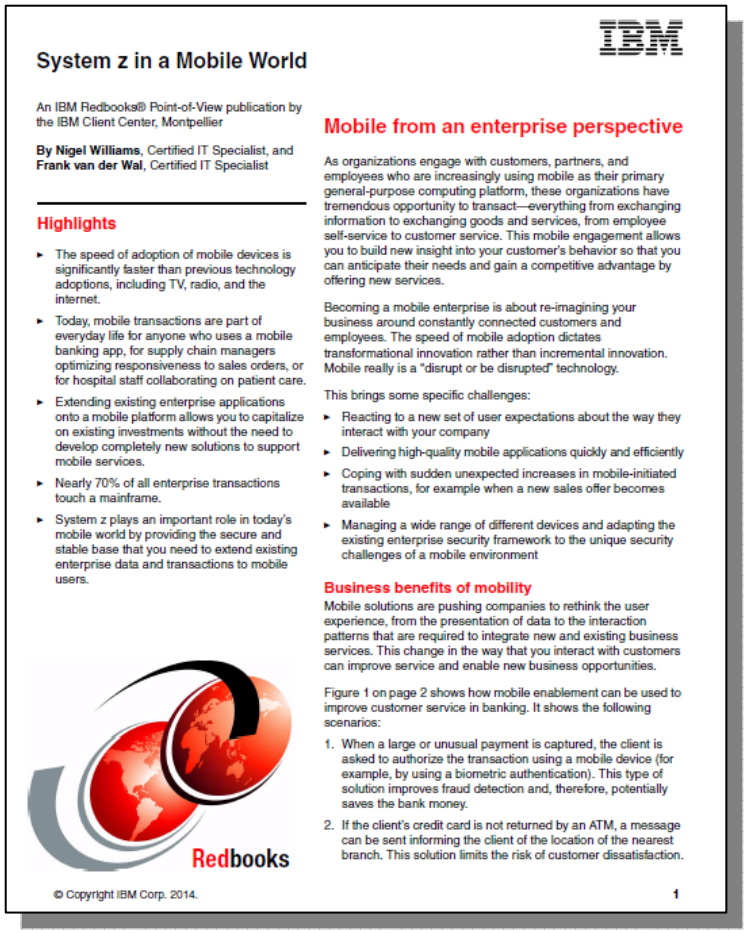
- ✓ System z is leader in transaction processing with the ability to handle volumes of critical data
- ✓ System z secures the data for mobile processing from mainframe to mobile device
- ✓ System z is the perfect environment for developing a mobile, cloud, and analytics integrated solution

System z

A sophisticated platform for mobile computing

Resources

- Point-of-View paper
- Request a Demo
  - Banking, Retail, Government, Insurance
  - Use Worklight on Linux on System z
  - Use z/OS transactions
- Try the System z Mobile demo applications
  - CICS Genapp
  - CICS EGUI
  - IBM Remote - Sample application to manage HMC
- System z Mobile home page
  - Customer case studies
  - Analyst reports
  - Customer Videos



IBM

System z in a Mobile World

An IBM Redbooks® Point-of-View publication by the IBM Client Center, Montpellier

By Nigel Williams, Certified IT Specialist, and **Frank van der Wal**, Certified IT Specialist

Highlights

- The speed of adoption of mobile devices is significantly faster than previous technology adoptions, including TV, radio, and the internet.
- Today, mobile transactions are part of everyday life for anyone who uses a mobile banking app, for supply chain managers optimizing responsiveness to sales orders, or for hospital staff collaborating on patient care.
- Extending existing enterprise applications onto a mobile platform allows you to capitalize on existing investments without the need to develop completely new solutions to support mobile services.
- Nearly 70% of all enterprise transactions touch a mainframe.
- System z plays an important role in today's mobile world by providing the secure and stable base that you need to extend existing enterprise data and transactions to mobile users.

Redbooks

Mobile from an enterprise perspective

As organizations engage with customers, partners, and employees who are increasingly using mobile as their primary general-purpose computing platform, these organizations have tremendous opportunity to transact—everything from exchanging information to exchanging goods and services, from employee self-service to customer service. This mobile engagement allows you to build new insight into your customer's behavior so that you can anticipate their needs and gain a competitive advantage by offering new services.

Becoming a mobile enterprise is about re-imagining your business around constantly connected customers and employees. The speed of mobile adoption dictates transformational innovation rather than incremental innovation. Mobile really is a "disrupt or be disrupted" technology.

This brings some specific challenges:

- Reacting to a new set of user expectations about the way they interact with your company
- Delivering high-quality mobile applications quickly and efficiently
- Coping with sudden unexpected increases in mobile-initiated transactions, for example when a new sales offer becomes available
- Managing a wide range of different devices and adapting the existing enterprise security framework to the unique security challenges of a mobile environment

Business benefits of mobility

Mobile solutions are pushing companies to rethink the user experience, from the presentation of data to the interaction patterns that are required to integrate new and existing business services. This change in the way that you interact with customers can improve service and enable new business opportunities.

Figure 1 on page 2 shows how mobile enablement can be used to improve customer service in banking. It shows the following scenarios:

1. When a large or unusual payment is captured, the client is asked to authorize the transaction using a mobile device (for example, by using a biometric authentication). This type of solution improves fraud detection and, therefore, potentially saves the bank money.
2. If the client's credit card is not returned by an ATM, a message can be sent informing the client of the location of the nearest branch. This solution limits the risk of customer dissatisfaction.

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