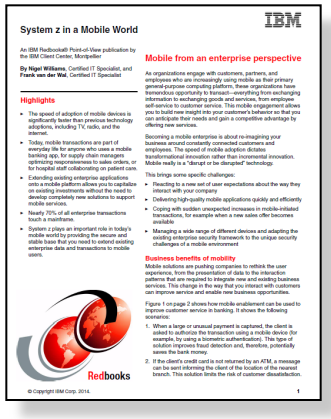
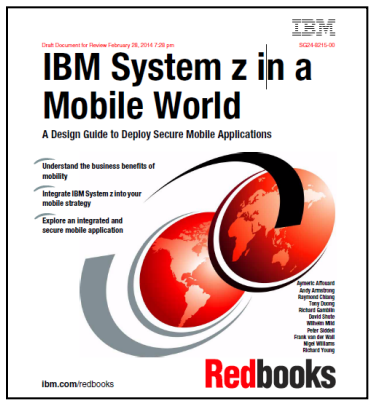
Deliver Enterprise Mobility on an Enterprise Platform

The role of System z in your mobile strategy

If you need to provide secure, timely, and quick access from mobile devices to critical data that resides on a mainframe, there are three things you must get right:

- Build an Agile Approach to Deliver Mobile Apps
- Secure Every transaction
- Use mobile analytics to improve outcomes at every moment





Evolution towards self-service

Mobile

SOA/Web 2.0

Web/Desktop

Client/Server

Green screen

2010s

2000s

1990s

1980s

1970s

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.

Mobile has already superseded the Web

Mobile is a disrupting technology

Mobile enables banks to offer new services

When a suspicious payment has been requested then…

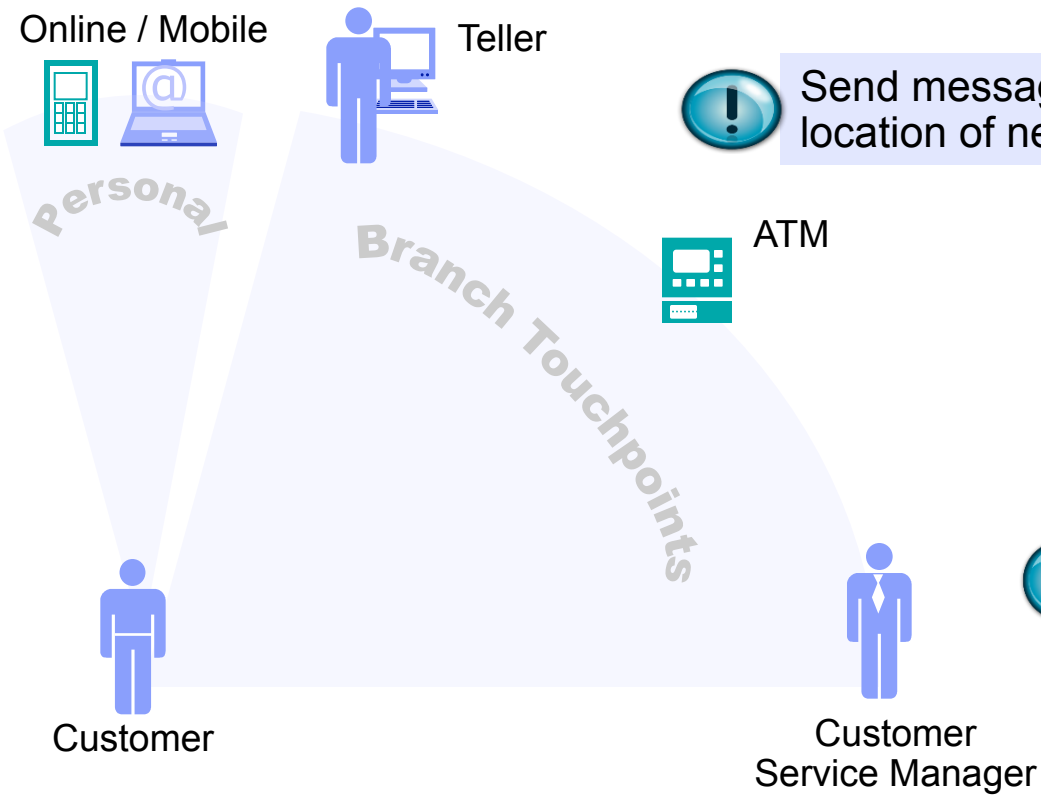
Request additional authentication

When a customer's card is not returned by the ATM then…

Send message with location of nearest branch

When a pending transaction will cause an account to be overdrawn then…

Promote overdraft protection offer



Enterprises face unique mobile challenges

Connecting apps with enterprise systems

- Apps typically need to leverage existing enterprise services, which must be made mobile-consumable

Accelerated time to market requirements

- A strategic approach to app delivery requires a *mobile enterprise application platform* (MEAP)
- Accelerated development demands instant provisioning of development servers

Managing the mobile workload

- Mobile apps increase the number of transactions
- Spikey mobile traffic demands highly scalable infrastructures

Device management and mobile security

- Highly fragmented set of devices and platforms requires a mobile device management (MDM) solution
- How to secure the mobile transaction end to end

Unique System z capabilities can help …

- Development tools that integrate System z data and transactions
- New **z/OS Connect** offering that provides uniform way for mobile devices to interact with System z

- IBM **Worklight** provides open, comprehensive platform to build, run and manage apps
- Running Worklight on **Linux for System z** benefits from virtualization capabilities

- System z can deliver an IT infrastructure that keeps pace with the **increased workload** that results from mobile engagement

- Take advantage of **security capabilities** of System z platform, EAL 4+ certification, hardware crypto, hipersockets, RACF, zSecure …

Becoming a mobile enterprise

- To become a mobile enterprise, there are three things you must get right:
  - **Build an agile approach to deliver applications**

    Transform the operational model to ensure the highest levels of speed, flexibility and quality in the application development and deployment process
  - **Make every transaction secure**

    Design and deliver transactions for all stakeholders that are as high in quality as they are high in frequency—and as secure as they are convenient
  - **Use mobile analytics to improve outcomes at every moment**

    Focus on mobile analytics to optimize processes, enable people and get the most out of technology

Build an agile approach to deliver applications

Transform the operational model to ensure the highest levels of speed, flexibility and quality in the application development and deployment process

Build an agile approach to deliver applications

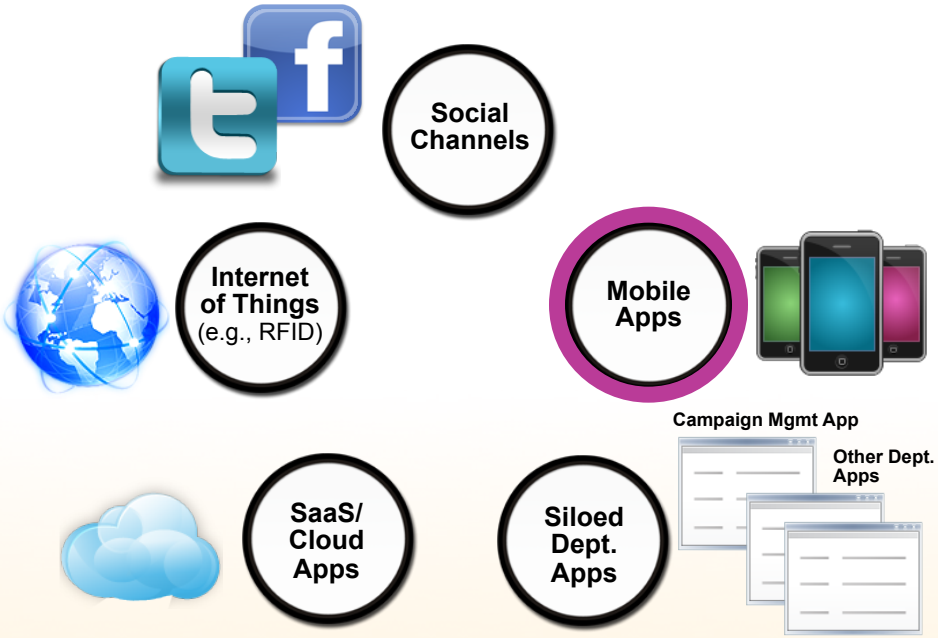
- The method in which businesses interact with their customers is changing
- Application providers must now "*engage*" the customer and not just service the specific request.

> *"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."*

- This engagement leads to the need for ***Systems of Engagement*** (SoE) that can enhance the user's experience with various service providers and that can also deliver new features at a rate previously unthinkable
- The engagement tier interacts with many sources of data, including the Internet of Things and ***Systems of Record*** (SoR) that often reside on the mainframe

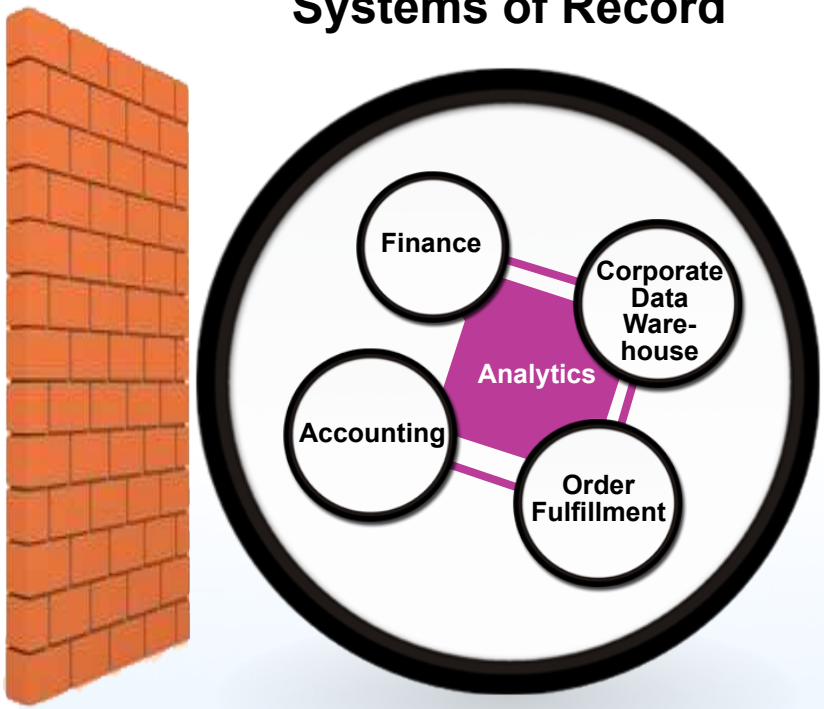
Mobile is a bridge between two worlds

Systems of Engagement



Systems of Engagement (SoE) are disconnected, piece parts

Systems of Record



Systems of Record (SoR) are well integrated and mostly complete

Typical mobile environment

Mobile Devices

- iOS
- Android
- Blackberry
- Windows Phone

JSON

Systems of Engagement

Mobile Enterprise Application Platform (MEAP)

- App updates
- Security
- Back-end connectivity
- Mobile Analytics

SOAP
XML
JSON
MQ
HTTP

Systems of Record

- CICS
- IMS
- WebSphere AS
- DB2

Analytics

Comparing XML with JSON

XML

```
<employees>
        <employee>
                <firstName>John</firstName>
                <lastName>Doe</lastName>
        </employee>
        <employee>
                <firstName>Anna</firstName>
                <lastName>Smith</lastName>
        </employee>
        <employee>
                <firstName>Peter</firstName>
                <lastName>Jones</lastName>
        </employee>
</employees>
```

300 Bytes Approx.

50,000 Example customer records:

XML: ~14 MB
JSON: ~7 MB

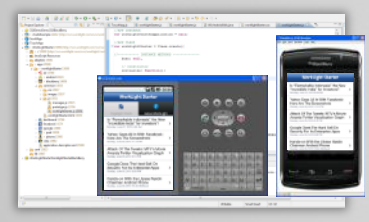
JSON

```
var employeesArray = [
  { "firstName":"John" , "lastName":"Doe" },
  { "firstName":"Anna" , "lastName":"Smith" },
  { "firstName":"Peter" , "lastName": "Jones" }
];
```

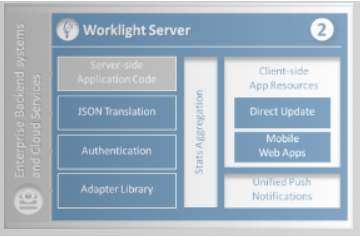
150 Bytes Approx.

It's the same data, *but 50% smaller!*

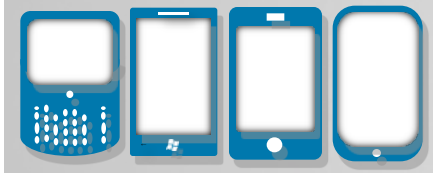
IBM Worklight overview



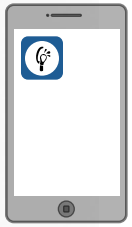
Worklight Studio
The most complete, extensible environment with maximum code reuse and per-device optimization

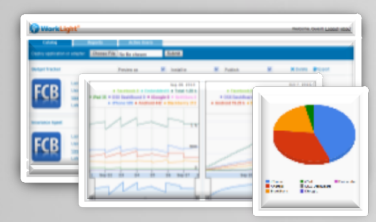


Worklight Server
Unified notifications, runtime skins, version management, security, integration and delivery



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

Running Worklight Server on System z

Linux on z

z/OS

Device

PhoneGap

Worklight

- Security and Authentication
- Back-end Data Integration
- Caching and local data

Application Code

JSON

Linux on z

Worklight Server

Server-side Javascript	**Application Center Enterprise App Store**
Worklight Console	JSON Translation
Push Notifications	Authentication
Analytics	Adapter Library

SAP

SQL

WMB

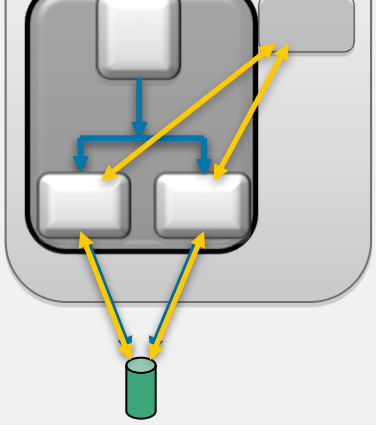
SOAP/XML

HTTP/REST

Cast Iron

z/OS

CICS



System z provides essential services for mobile applications

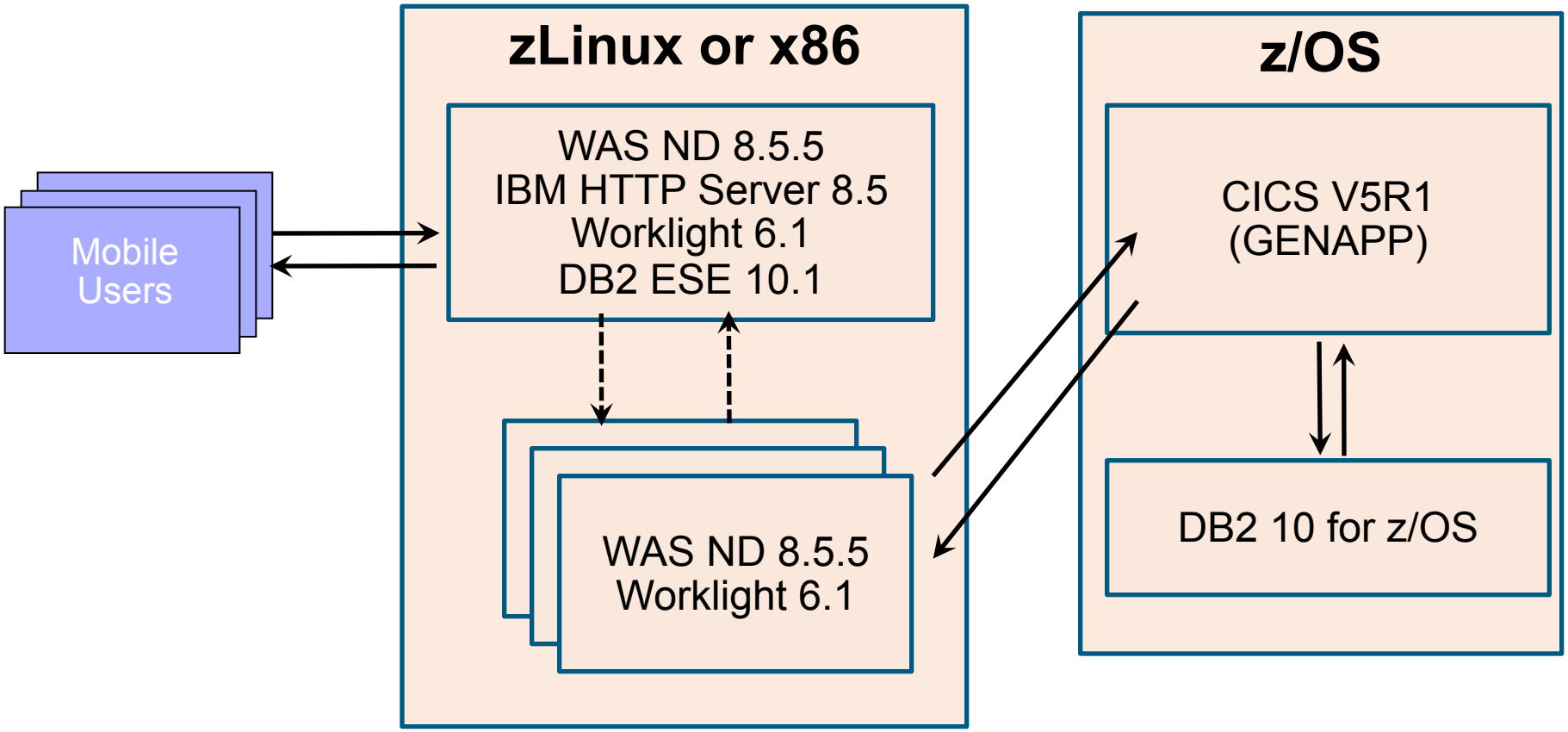
Leader as System of Record (z/OS)

1. Provide easily consumable mobile access to all the data and transaction in z subsystems (DB2, CICS, IMS, MQ, etc)
   - Including new z/OS Connect services
2. z/OS availability and scalability is crucial for mobile workloads
3. New pricing model for mobile transactions

Key Player as System of Engagement (Linux on z)

1. Tools to satisfy the lifecycle requirements for mobile application development
   - Worklight studio and server and Rational
2. Linux on System z is a good fit for mobile infrastructure
   - Exploit co-location with z/OS data and transactions
   - Availability and scalability to handle mobile workloads
   - Exploit z security and encryption for use by mobile apps
   - Leverage cloud capability to create new mobile dev and production clouds

Worklight Performance Test - Architecture

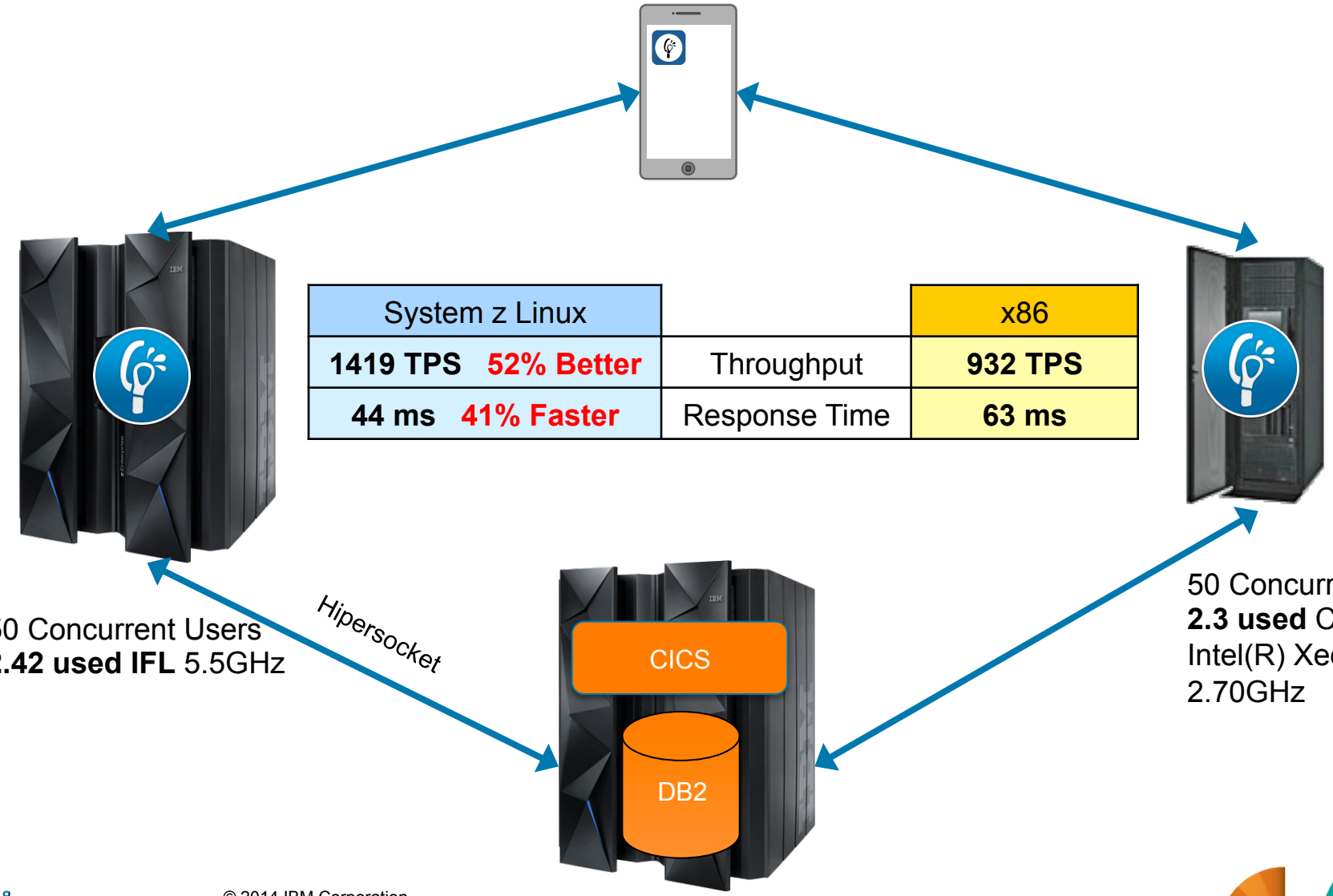


Raw Test Results Summary

- Test 4: Mix (60% Login,30% Add or Delete,10% Update)

		Worklight server on z/Linux			Worklight server on x86		
Number of CPU per Worklight server	Number of users	Response Time (ms)	Throughput (TPS)	Max number of physical CPU used (on 8CPs)	Response Time (ms)	Throughput (TPS)	Max number of physical CPU used (on 16Cores)
1	10	42.9	295.71	0.56 (avg 0.55)	50.2	242.89	0.75 (avg0.68)
	30	44.5	850.4	2.17 (avg 1.90)	54.9	652.6	1.7 (avg1.7)
	50	47.7	1304.1	2.32 (avg2.21)	59.5	991.8	2.5 (avg2.14)
	100	60.3	2000	3.30 (avg3.18)	75.4	1518.1	3.87 (avg3.87)
	200	104.4	2195.8	3.67 (avg3.41)	132.2	1676.2	4.26 (avg4.26)
	400	189.9	2361.2	3.88 (avg3.78)	256.8	1699.1	4.64 (avg4.64)
	600	293.1	2248.1	3.96 (avg3.71)	357.8	1843.8	4.7 (avg4.7)
2	10	42.8	296.34	0.61 (avg0.59)	50	244.12	0.75 (avg0.75)
	30	43	881	2.3 (avg1.74)	54.4	659	1.83 (avg1.83)
	50	44.4	1418.9	2.48 (avg2.42)	62.5	931.8	2.3 (avg2.3)
	100	48.6	2554.3	4.30 (avg4.21)	68.7	1675	4.14 (avg4.14)
	200	70.8	3320.2	6.02 (avg5.34)	95.7	2337.7	6.08 (avg6.08)
	400	131.4	3446.1	5.96 (avg5.53)	205.4	2145.2	4.96 (avg4.96)
	600	215.1	3126.9	5.97 (avg5.08)	291.6	2264.7	6.05 (avg6.0[illegible])

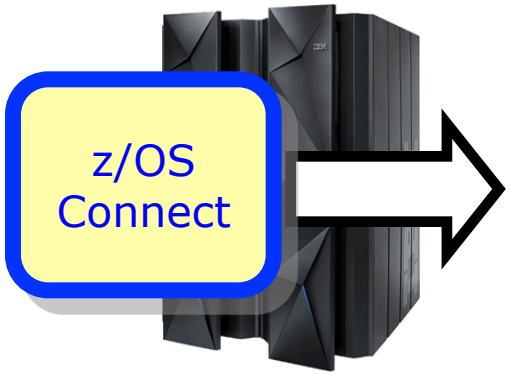
Worklight Server performance test



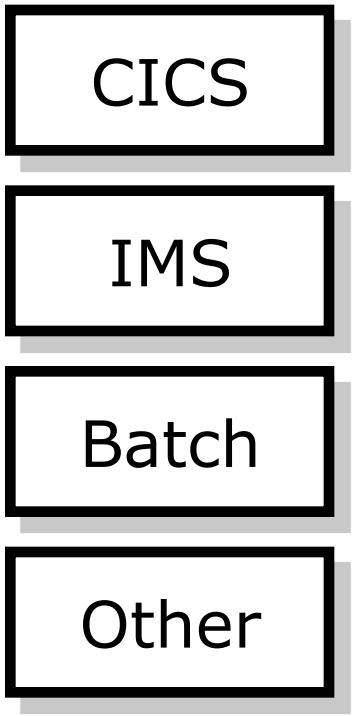
What is z/OS Connect?

It's about getting REST and JSON into your mainframe environment in a way that enables you to best take advantage of the assets that exist there:

Where z/OS Connect fits



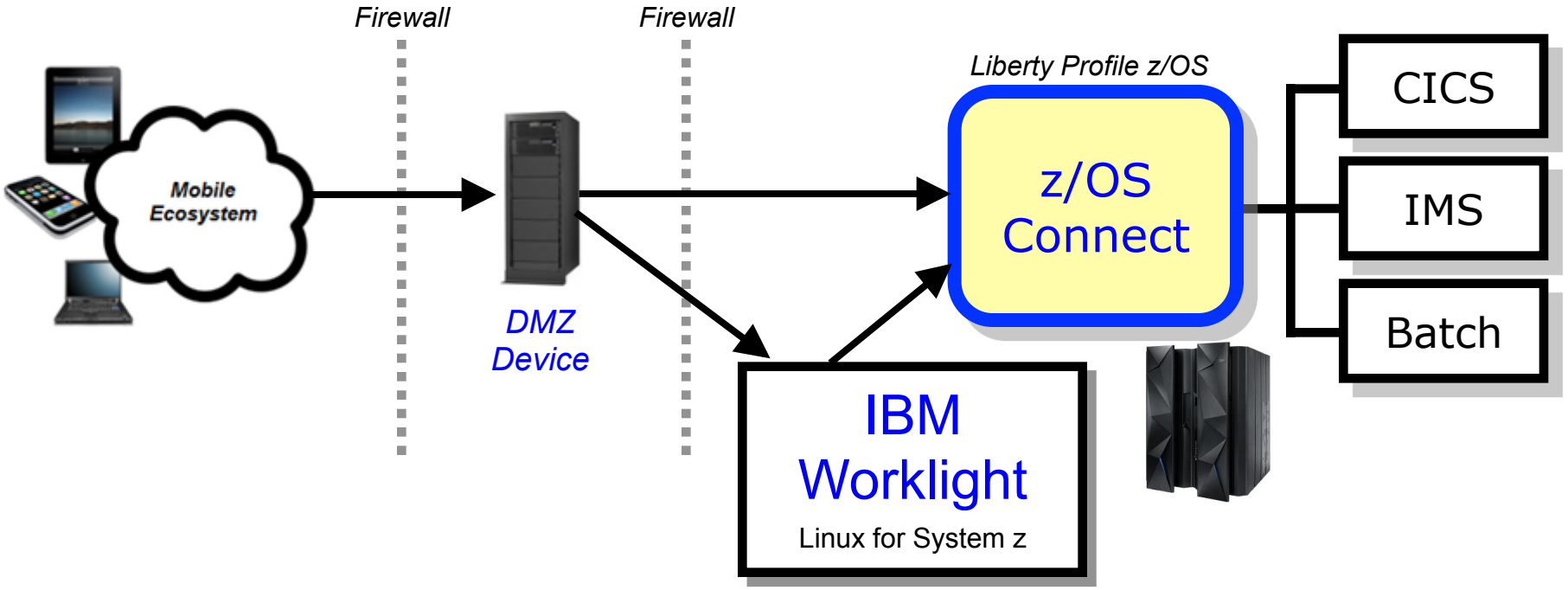
- Liberty Profile Server
- Function IBM wrote to run in Liberty Profile
- No charge function provided with license entitlement to WAS z/OS, CICS or IMS



REST – Representational State Transfer … the use of HTTP URLs that map to a 'service', such as 'query account' or 'update data'

JSON – JavaScript Object Notation … a standard of representing data as a set of name/value pairs. This is passed back and forth along with REST request/responses

Context Within Overall Mobile Architecture



Users of z/OS Connect would access through normal corporate firewall infrastructure

IBM Worklight to provide application management, security and operational governance for mobile applications

z/OS Connect would be behind the secure firewall, and on LPARs along with backend systems

z/OS Connect sample requests

Request a **list of all services known in a server** – HTTP GET (returns JSON response)

```
http://<hostname>:<port>/zosConnect/services/
<JSON Out>
```

Request **information about a single service** – HTTP GET (returns JSON response)

```
http://<hostname>:<port>/zosConnect/services/<name>
<JSON Out>
```

Request **z/OS Connect service invoke** – HTTP POST or PUT (received JSON requests / returns JSON response)

```
http://<hostname>:<port>/zosConnect/services/<name>?action=invoke
<JSON In>
<JSON Out>
```

Request **service invoke with parameters** – HTTP POST or PUT (received JSON requests / returns JSON response)

```
http://<hostname>:<port>/zosConnect/services/<name>?action=invoke&<PARMS>
<JSON In>
<JSON Out>
```

Call service **using invokeURI** – HTTP GET (returns JSON response)

```
http://<hostname>:<port>/customerApp/getCustomer?customerNumber=1000
<JSON Out>
```


Make every transaction secure

Design and deliver transactions for all stakeholders that are as high in quality as they are high in frequency—and as secure as they are convenient

Secure every transaction

- The mobile platform must be able to cope with the additional number of transactions and '*spikeyness*' that mobile enablement brings

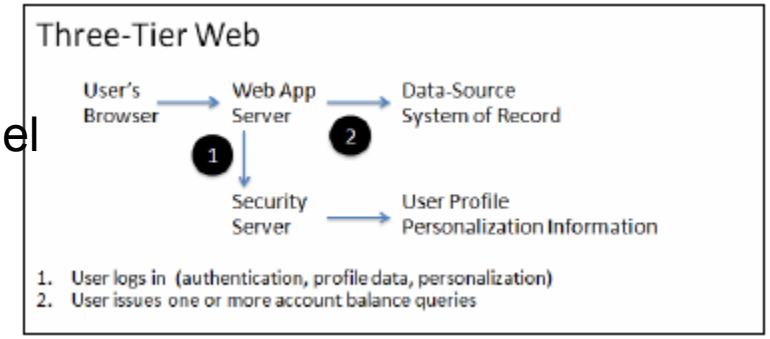
> *"Several large banks have told IBM that their **"mobile apps are crushing IT"** and that transactions with relatively low value to the bank are being frequently, almost whimsically, performed morning, noon, and night."*

- The mobile platform must be able to cope with the additional security risks that mobile enablement brings.

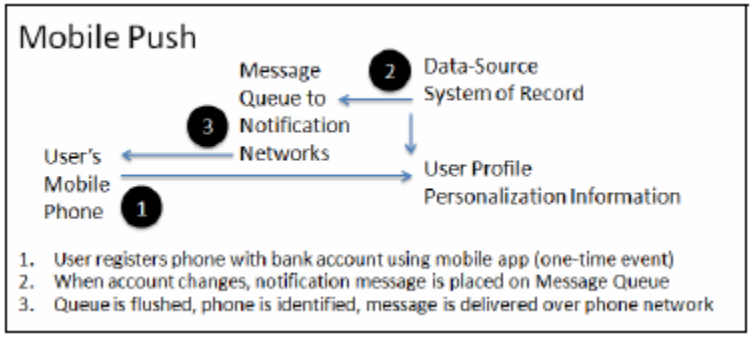
> *"Securing the mobile transaction **end to end** has emerged as the most important concern of the mobile revolution, because the organization's information and data is distributed beyond the secure perimeter and transactions are executed on mobile devices, which can be shared and are often personally owned."*

Push, Don't pull

- A push model may be more effective for low value transactions like balance inquiries
- Traditional three-tier web '**pull**' model



- '**Push**' model



- Push model results in less transactions and transactions are spread out more evenly

See '*Mobile Design Patterns: Push, Don't Pull*', RED-5072
http://www.redbooks.ibm.com/abstracts/redp5072.html?Open

What's different about mobile security?

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

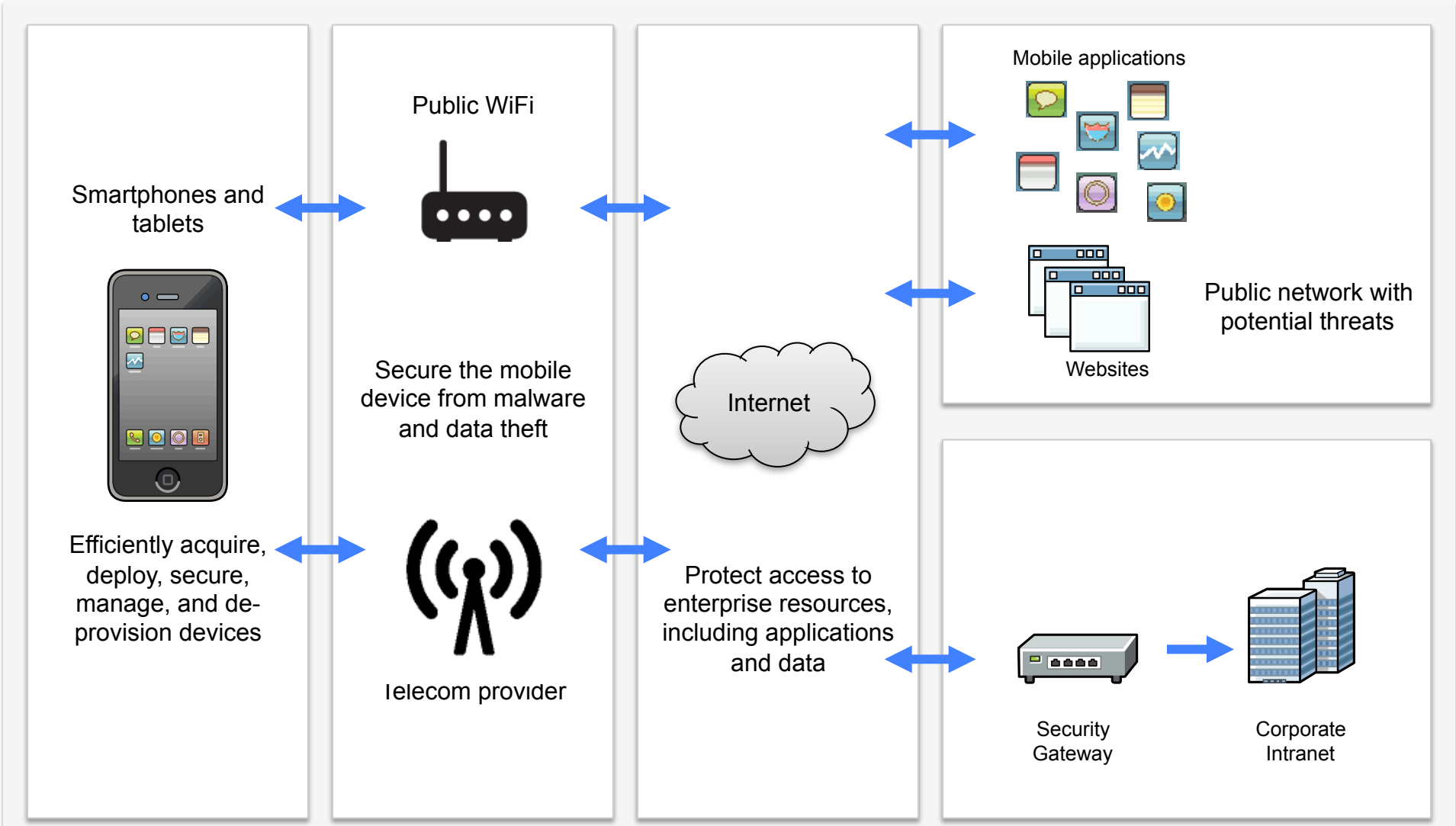
Mobile devices **are used in more locations**

- 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

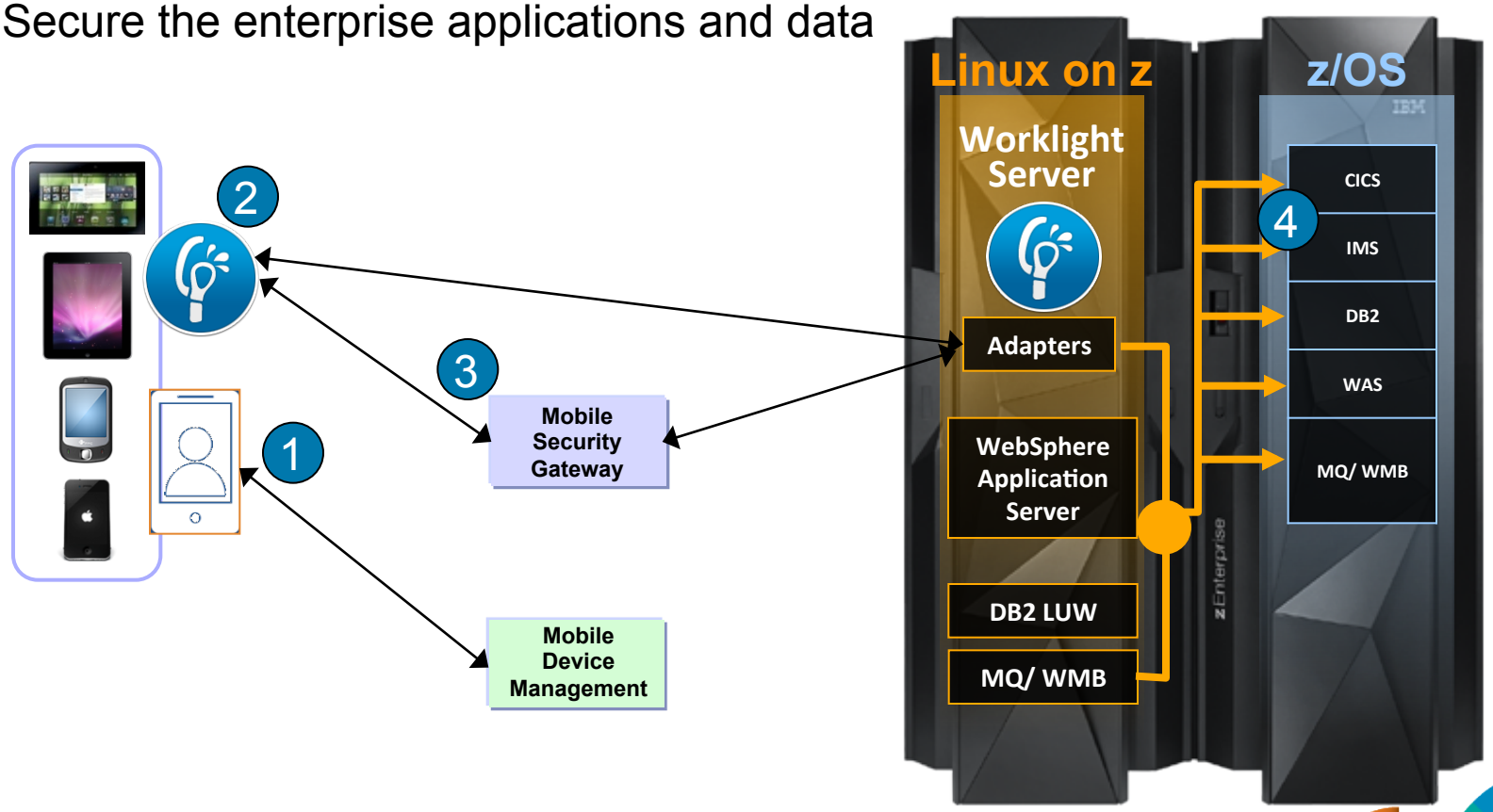
Security concerns of mobile devices accessing corporate systems



Attain visibility into enterprise security events to stay ahead of the threats

Secure the mobile transaction end to end

1. Secure the mobile device
2. Secure the mobile application
3. Secure the transaction over the network
4. Secure the enterprise applications and data



Use mobile analytics to improve outcomes at every moment

Focus on mobile analytics to optimize processes, enable people and get the most out of technology

Use mobile analytics to improve outcomes at every moment

> *"The continuous activity of mobile devices—both human-driven and automated —is creating vast amounts of data about users, networks, device behaviors, physical environments and more."*

- By capturing and making sense of this data in real time and in context, organizations can understand customers, partners, employees and processes better than they ever have before
- And by seamlessly transforming those insights into the best mobile-delivered services, these same organizations can enable better, faster, context-driven decisions and actions
- To make the most of mobile analytics, you need to:
  - Build a MEAP that is capable of capturing data from mobile transactions
  - Be able to aggregate on data from back-end systems
  - Act on the data

Can capture data in different places

Mobile Devices

- iOS
- Android
- Blackberry
- Windows Phone

JSON

Systems of Engagement

Mobile Enterprise Application Platform (MEAP)

- Security
- Back-end connectivity
- Protocol conversion
- Mobile Analytics

SOAP
XML
JSON
MQ
HTTP

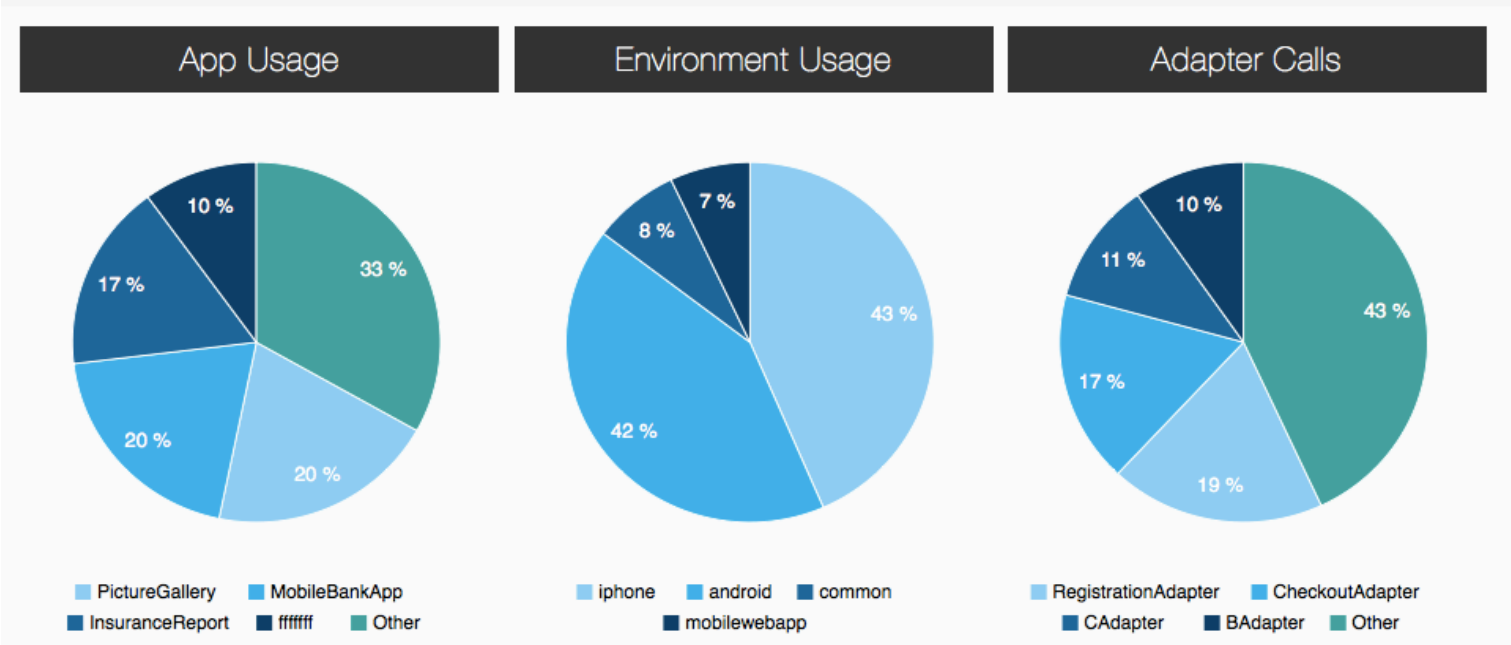
Systems of Record

- CICS
- IMS
- WebSphere AS
- DB2
- Analytics

Worklight Analytics

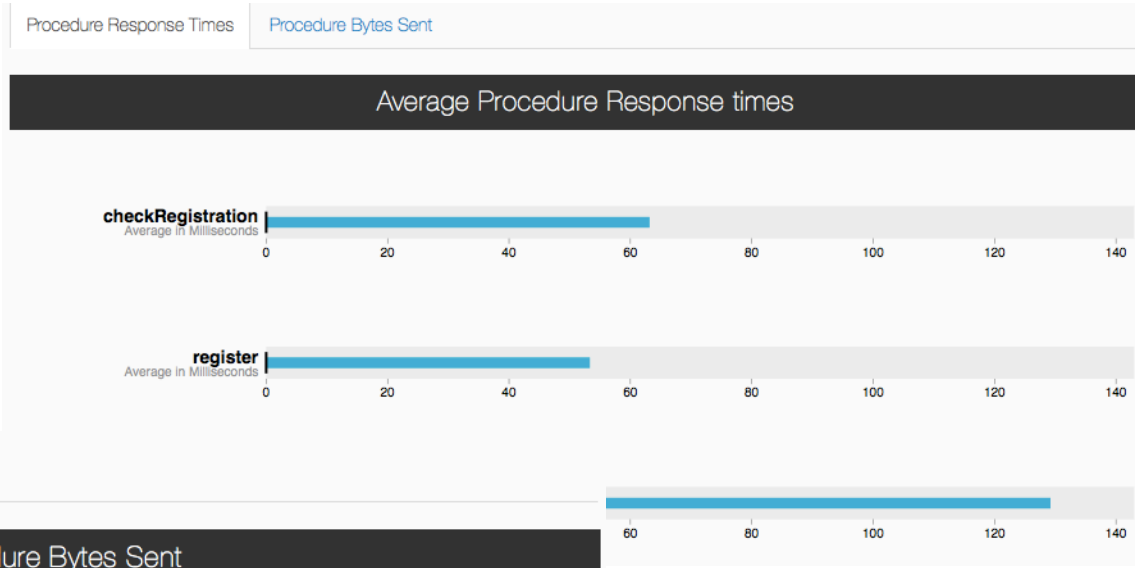
- Out-of-the-box Worklight analytics address the following:
  - User adoption, device and app usage
  - User actions and called adapter procedures
  - Performance and data usage information
  - Exceptions, crashes, logs, response time
  - JSONStore performance

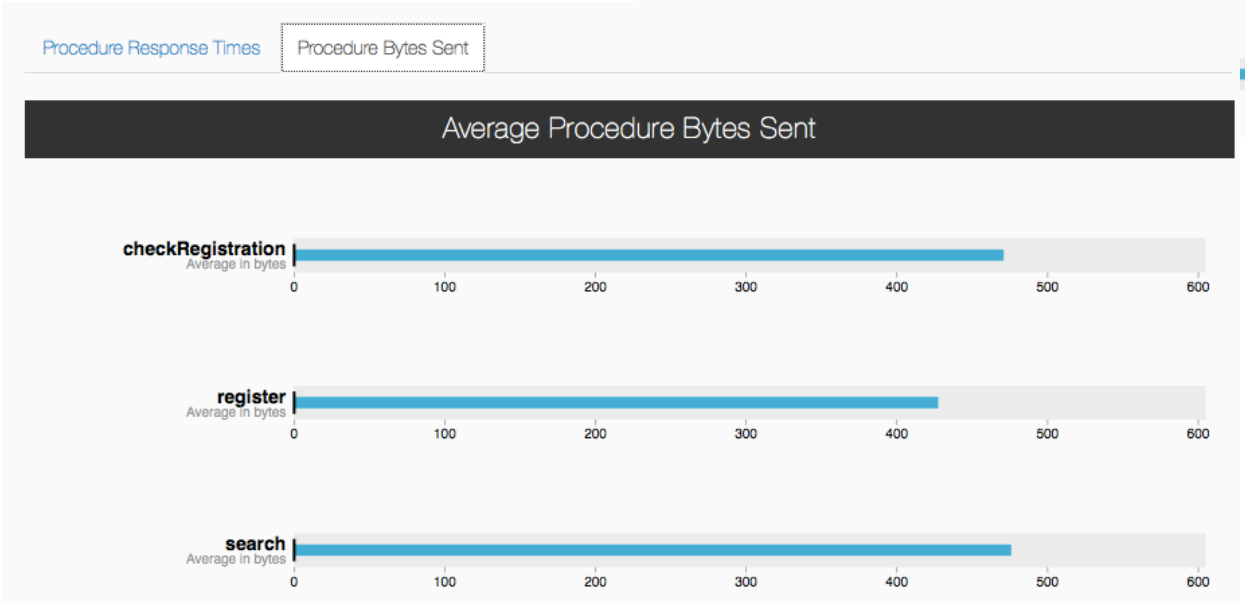
- Analytics component now provided in a WAR for simple install and administration



Service integration analytics

- Robust analytics for adapter usage including average response time, average data usage, and server usage statistics





Wrap-up

System z plays an important role in today's mobile world

- 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
- 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