



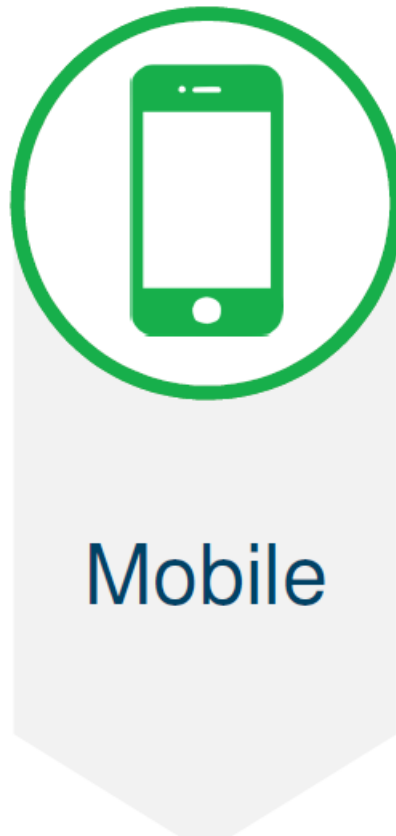
IBM's System z Forum

The value of your mainframe

Mobile workload pricing and z/OS connect

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Sep 2014

Why enterprises are putting Mobile First



1B

Smartphone users by 2016

91%

always keep mobile at arms reach

\$534b

Mobile transactions by 2015

95%

of Mobile traffic is data by 2015

75%

of users act on location-based offers

11,000

APIs on the Programmable Web

90%

using combination of multiple devices



Mobile business opportunity is huge



The Death Of the PC?

Now that we carry computers in our pockets, desktops and laptops are on the decline

SMALLER DEVICES WILL TAKE OVER

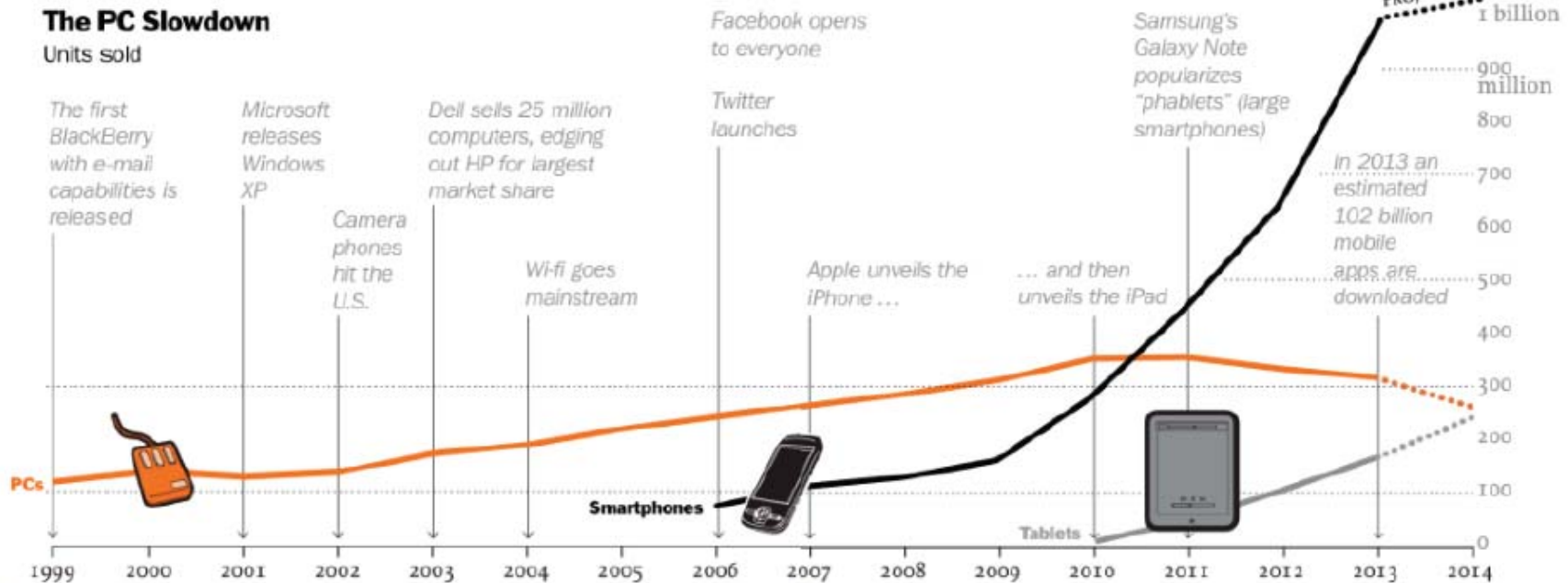


1.2B

NOTE: Ericsson predict 4.5B in 2018
(World population ~ 7.2+B)

The PC Slowdown

Units sold

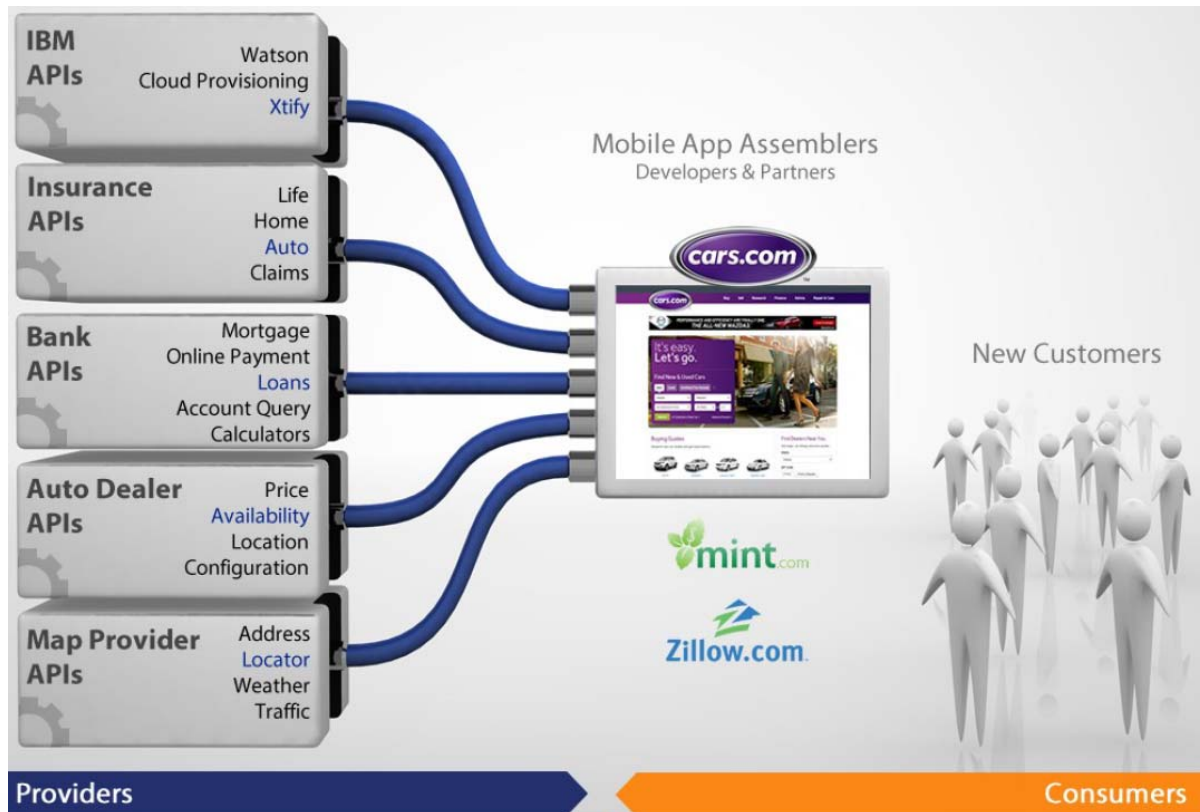


SOURCE: GARTNER, DECEMBER 2013

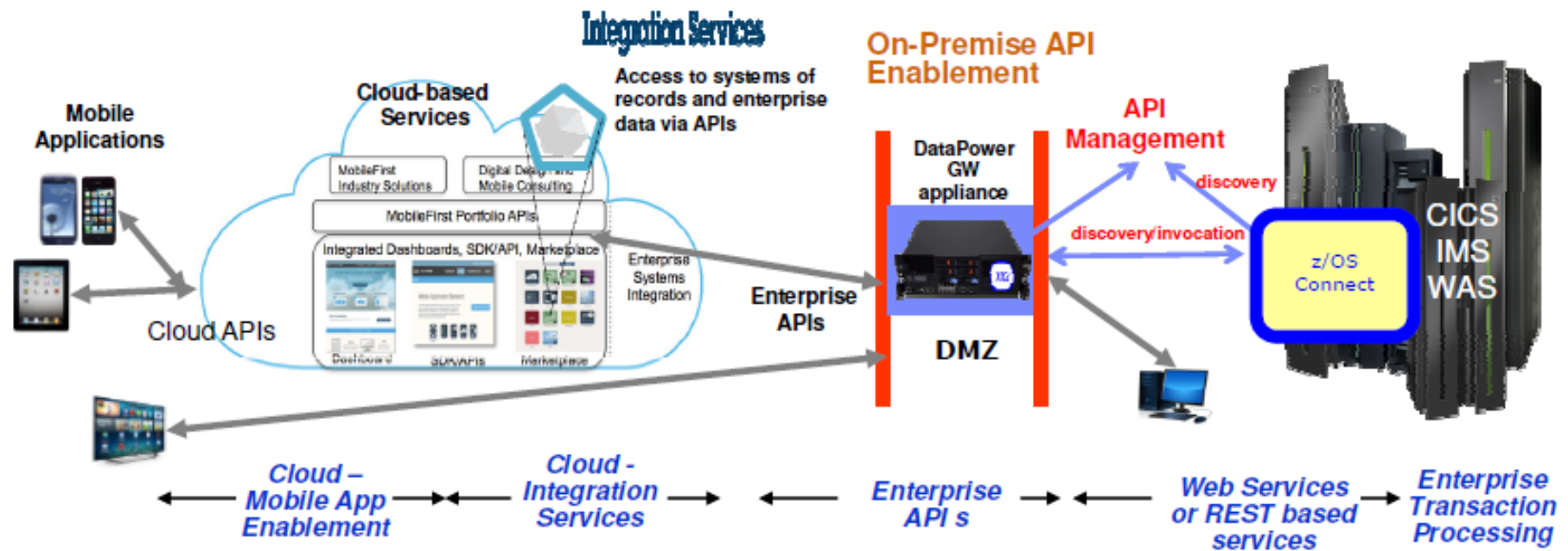
- Applications developed and run in the Cloud Infrastructure based on API's
- Common way to interact with z/OS applications using REST and JSON
- Mobile applications concerns:
 - Unpredictable load spikes on z/OS
 - Large percentage of requests are just queries
 - Customers repeatedly checking their bank balances



The API economy



End-to-End Architecture for Mobile and Cloud Application invoking z Services using APIs



- Responsive
 - Quickly API enable existing APIs from CICS, DB2, IMS to support new channels such as Mobile
- Scalability
- Security
- z/OS Workload Management
- Low-latency access to critical enterprise data
- Business Resiliency for critical mobile apps

“70% of mobile applications touch a mainframe system”

Infrastructure matters for mobile applications. The System z platform’s scalability, security, and resilience can enhance critical mobile applications.



Mobile Workload Pricing for z/OS



- **Benefits**
 - Reduces cost to handle mobile workloads
 - Enhancement to Sub-Capacity pricing
 - No infrastructure changes required

- **Customer requirement**
 - **Need to explain how they will tag and track mobile transactions and CPU used**
 - Addendum for System z Mobile Workload Pricing (INTC-6300)
 - Terms and conditions to receive MWP benefit for AWLC, AEWLC, zNALC billing
 - Supplement to the Addendum for System z MWP (INTC-6628)

- **Hardware requirements**
 - Must have a zEC12 or zBC12 server
 - But savings apply to all LPARs



How much will Mobile pricing save you ?



- Mobile Pricing will subtract **60%** of the MSU's attributed to CPU used to process Mobile workload

- It is NOT 60% off the total MSU's used

- 60% reduction in MSU's does not necessarily equate to 60% savings in billing charge
 - Due to the way z/OS price curves work

- The adjusted MSU amount is applied to all software running in the LPAR

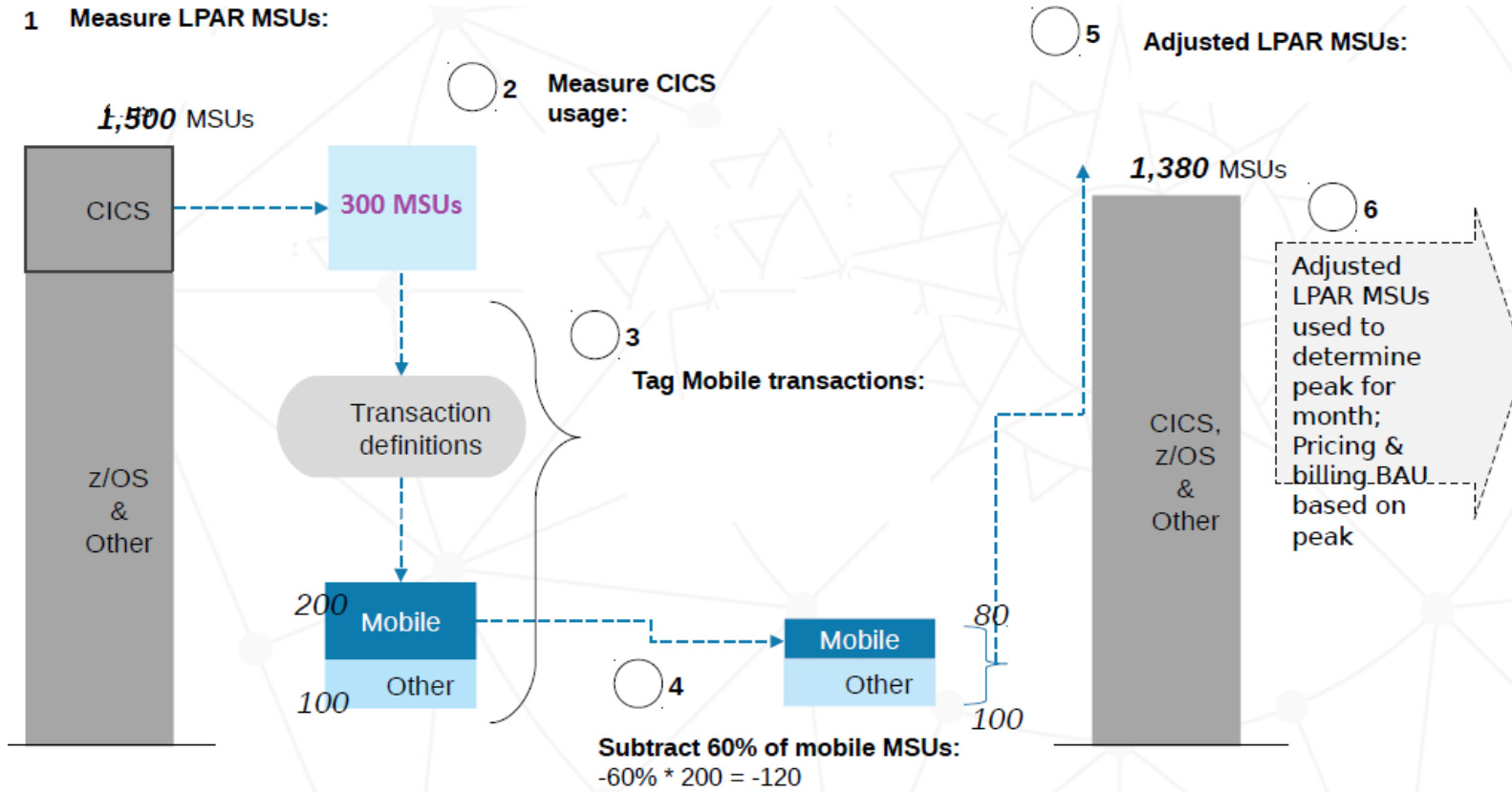
- MWP Announcement Letter
 - AP14-0219
 - <http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?infotype=an&subtype=ca&appname=g pateam&supplier=872&letternum=ENUSAP14-0219>



Mobile pricing on System z



1 Measure LPAR MSUs:



LPAR MSUs for billing (Standard)

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

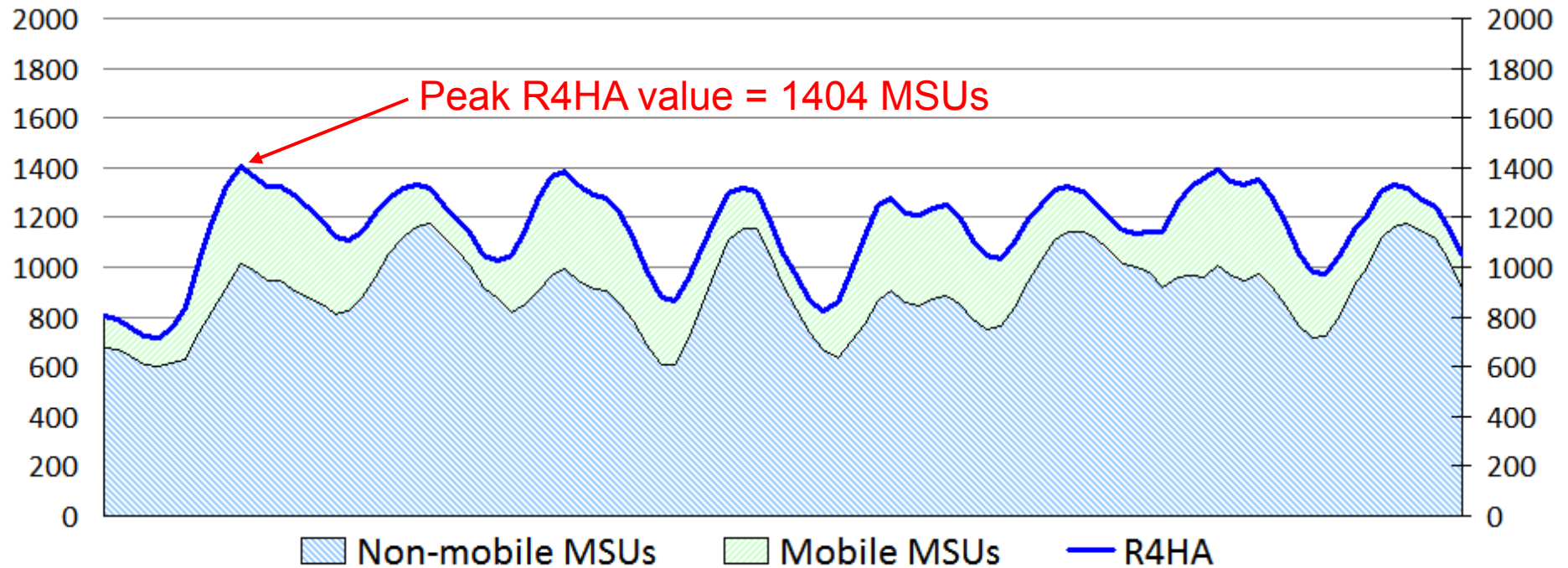
LPAR MSUs for billing (Adjusted)

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

Figures are for illustrative purposes only.



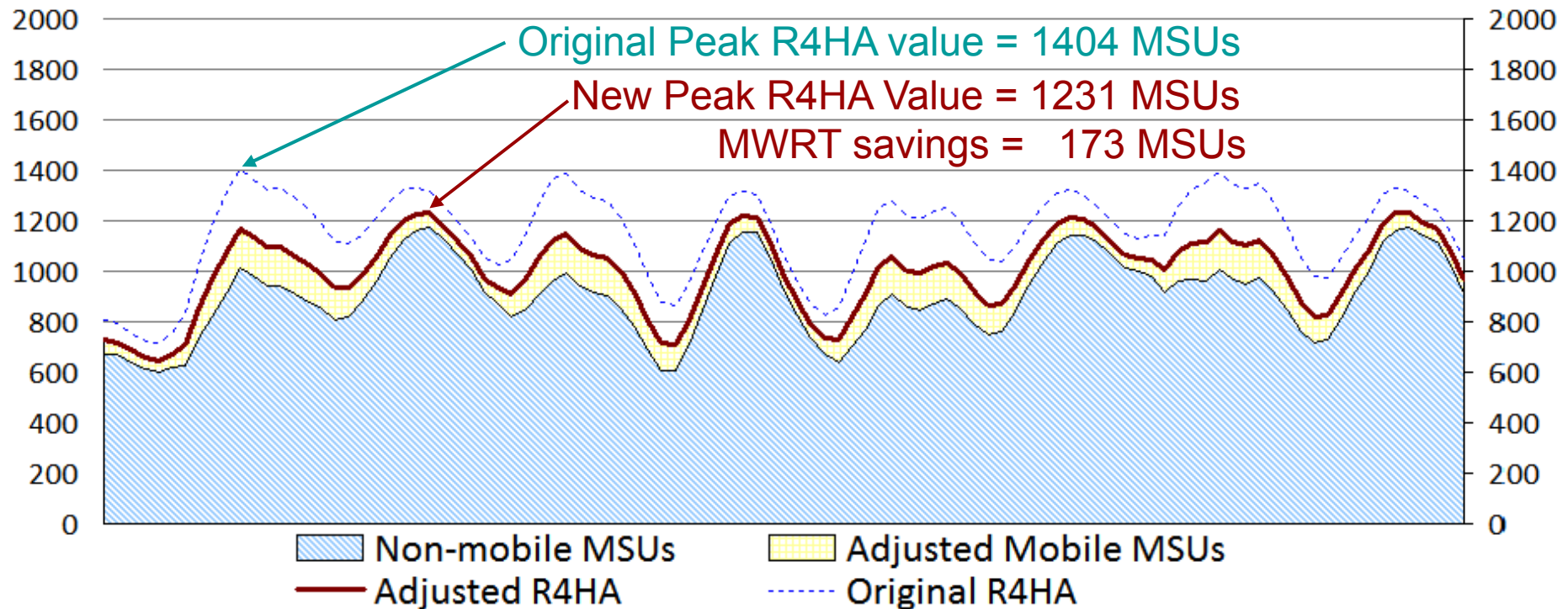
Example: Sample LPAR MSU values by hour



- SCRT calculates the Rolling 4-Hour Average (R4HA) MSU peak
 - All workloads are included



LPAR MSU values adjusted for mobile contribution



- MWRT removes 60% of the Mobile workload billing, interval-by-interval
 - Non-mobile workload contribution to billing is unchanged
 - **Billing MSUs** for the month are based upon the newly calculated R4HA curve after the mobile workload has been reduced

*Provides benefit when Mobile workloads contribute to monthly peak MSUs;
Off-peak MSU adjustments will not affect MSUs used for billing.*

Detailed MWRT Reporting Example



5655-S97	CICS TS for z/OS V4					
Processor Type Serial	2817-XXXX					
Date Time of Interval	LPAR Total MSUs					Machine
	<u>LPAR1</u>	<u>LPAR2</u>	<u>LPAR3</u>	<u>LPAR4</u>	<u>LPAR5</u>	<u>Total</u>
02 Nov 2013 - 00:00 UTC	197	354	28	143	198	920
02 Nov 2013 - 01:00 UTC	205	329	27	131	180	872
02 Nov 2013 - 02:00 UTC	Mobile MSUs (from CPU seconds)					Machine
02 Nov 2013 - 03:00 UTC	<u>LPAR1</u>	<u>LPAR2</u>	<u>LPAR3</u>	<u>LPAR4</u>	<u>LPAR5</u>	<u>Total</u>
02 Nov 2013 - 04:00 UTC	79	142	11	57	79	368
02 Nov 2013 - 05:00 UTC	82	132	11	52	72	349
02 Nov 2013 - 06:00 UTC	73					
02 Nov 2013 - 07:00 UTC	54					

1 **Capture LPAR MSUs**
(SMF 70 records)

2 **Customer requirement – Provide Mobile CPU seconds by interval:**
Customer input with IBM approval.
Values provided monthly in CSV format.

	Mobile MSU reduction					Machine
	<u>LPAR1</u>	<u>LPAR2</u>	<u>LPAR3</u>	<u>LPAR4</u>	<u>LPAR5</u>	<u>Total</u>
	(47)	(85)	(7)	(34)	(48)	(221)
	(49)	(79)	(6)	(31)	(43)	(209)
	(44)					
	(33)					
	(25)					
	(23)					
	(26)					
	(30)					

3 **Tool will subtract 60% of Mobile MSUs from LPAR original values**

	Adjusted LPAR Values for Billing					Machine
	<u>LPAR1</u>	<u>LPAR2</u>	<u>LPAR3</u>	<u>LPAR4</u>	<u>LPAR5</u>	<u>Total</u>
	150	269	21	109	150	699
	156	250	21	100	127	662
	138	213	19			
	103	162	16			
	80	131	16			
	73	140	17			
	81	138	18			
	93	139	18			

Formula for LPAR 1, Interval 1:

LPAR1 Total MSUs = 197
 Mobile only MSUs = 79
 Subtract 60% of Mobile =
 (79 * 0.60 = 47)

Adjusted LPAR MSUs:
 197 - 47 = 150

4

Adjusted LPAR totals used to determine new monthly peak.



Mobile Workload Pricing Reporting Process



- New Mobile Workload Reporting Tool (MWRT)
 - Windows-based Java tool to report sub-capacity MSUs
 - makes adjustment to reported LPAR MSUs based on Mobile transaction data
 - Calculates the monthly MSU peak for a given machine using the adjusted MSU values

- Customers must track mobile transactions
 - Each month produce a file showing mobile CPU consumption
 - Mobile transactions are transactions processed by z/OS middleware from a phone or tablet
 - not from a desktop or laptop

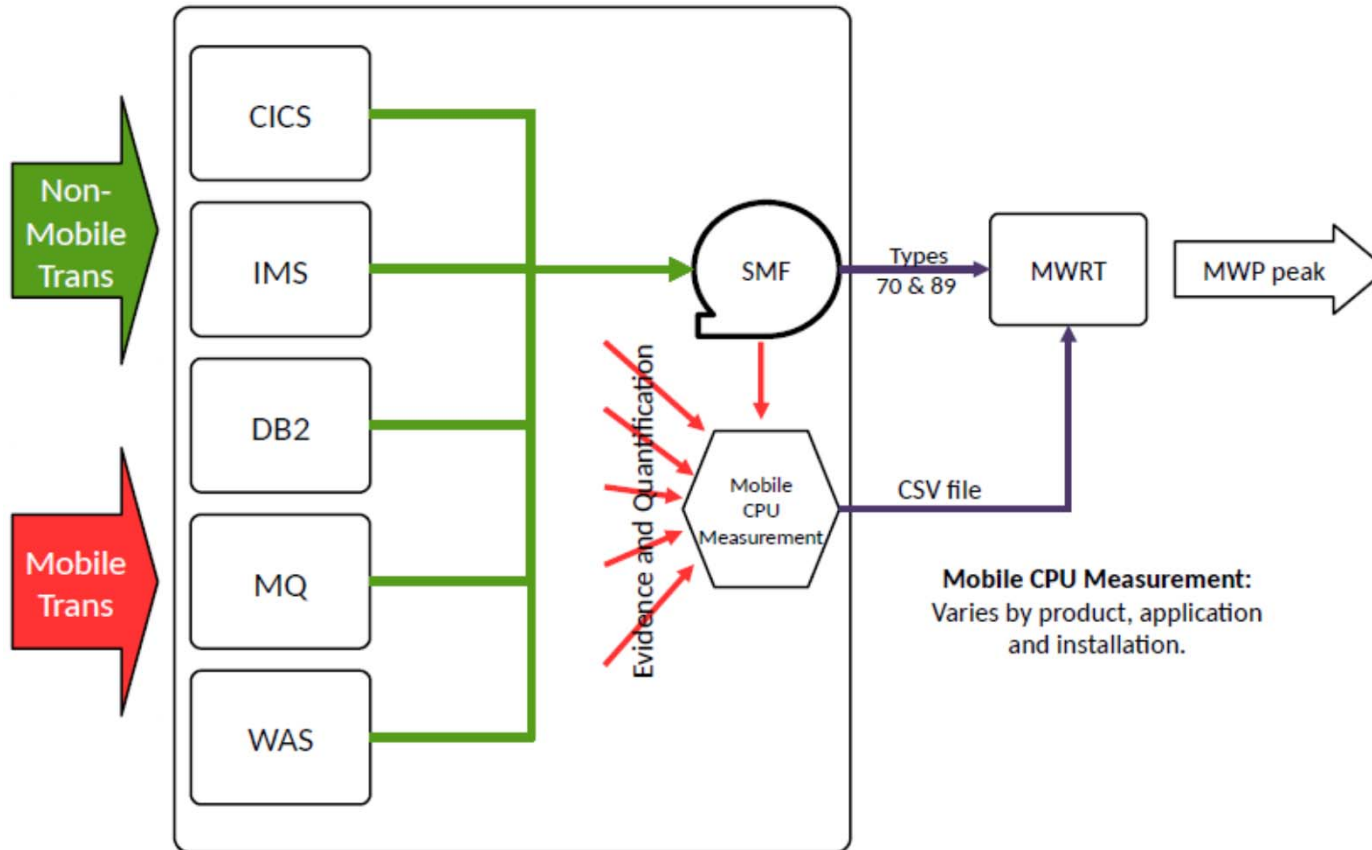
- User Guide
 - <http://www.ibm.com/common/ssi/cgi-bin/ssialias?infotype=SA&subtype=WH&htmlfid=ZSL03332USEN>

- Download from:

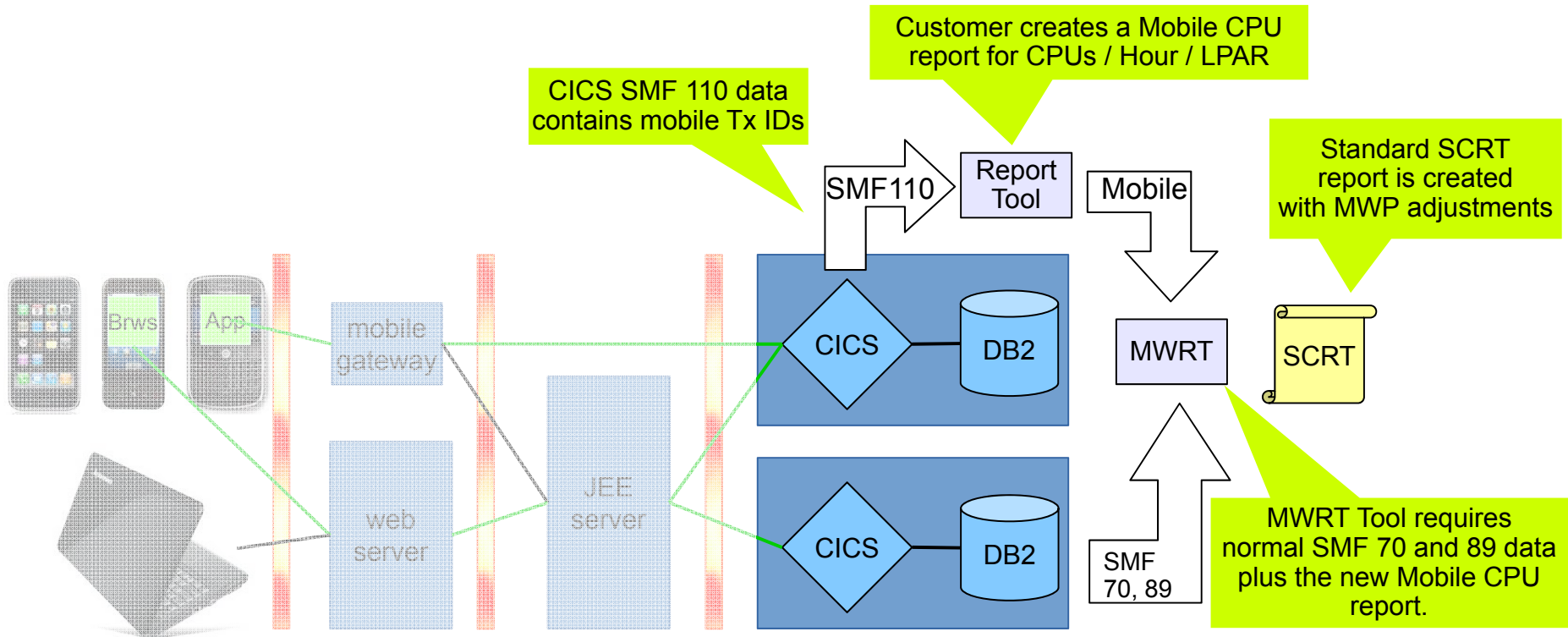
– <https://ibm.biz/MWRTdownload>



Overview of Tagging and Tracking Process



Example of Tagging and Tracking Process



Which Tracking mechanisms can be used with MWP?



- Use an **individual LPAR** for mobile-only workloads. All defining programs in here can report their GCP CPUs as mobile CPUs.
- Build **individual subsystems** of the defining programs for mobile-only workloads. These can then report their GCP CPUs as mobile CPUs.
- Use same subsystems for mobile and non-mobile but create **different CPU reports for mobile CPU**.

How could this be done? Examples:

- CICS: Transaction id, TCP/IP port, User id → SMF110 Report
- IMS: LTERM, IMS Transaction Name, User id → Transaction Level Statistics x'56FA'
- MQ: Connection Type, Queue Name → SMF 116 Report
- DB2: JDBC stats like 'Program Name' → SMF 102 Report
- WAS: unique URL for mobile → SMF 120.9 Report

Note: this presentation contains examples of mobile tracking for CICS



CICS PA performance list report



- The Performance List report provides a detailed list of the CMF performance class records
- You can request a list of all available records, or specify selection criteria to list only the information that meets specific requirements
- The example report below shows a performance list report for the GENAPP transactions with selected report fields (trans id, user cpu, cpu time on standard CP, transaction origin type, originating client or telnet ip address and originating TCPIP SERVICE name)

Tran	User CPU Time	CPUonCP Time	Origin	OClntIP	OTCPIPSr
SSC1	.0007	.0007	TERM	9.143.31.40	
CWXN	.0002	.0002	SOCKET	9.143.31.40	GENATCP2
CPIH	.0014	.0014	WEB	9.143.31.40	GENATCP2
CWXN	.0003	.0003	SOCKET	9.212.136.76	GENATCP1
CPIH	.0013	.0011	WEB	9.212.136.76	GENATCP1
SSP1	.0001	.0001	TERM	9.143.31.40	

These transactions qualify for MWP and this is the transaction CPU utilization eligible for MWP

Disclaimer: Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. There is no guarantee that these measurements will be the same on other systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary.

IBM Customer Agreement



Supplement to the Addendum for System z Mobile Workload Pricing

The terms of the IBM Customer Agreement (or any equivalent agreement in effect between us) and its Addendum for System z Mobile Workload Pricing ("Addendum") apply to this transaction.

Mobile Application name: Bank Account Mobile App
MWP Defining Program(s): CICS, IMS

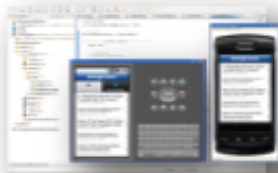
Mobile Application Details

Details regarding the Mobile Application specified above are in the table below.

A. MWP Defining Program	B. Data source	C. Method to distinguish mobile transactions from other workload	D. Client process for capturing and processing the mobile data
e.g., CICS	e.g., SMF 110	e.g., All transaction types originating from mobile devices (e.g. iPhone app traffic) have been assigned unique names and routed to a specific region.	e.g., Filter mobile transaction types by name from all transactions using a SAS program, and sum the CPU seconds by hour for the affected LPARs.
e.g., IMS	e.g., IMS Logs	e.g., Enable IMS Transaction Level Statistics to produce 56FA log records for the mobile transactions; All mobile transactions contain the word "mobile" in the LUName.	e.g., Extract the mobile transaction details from the IMS log records using IMS PA and sum the CPU seconds by hour for the affected LPARs.



Development



Worklight Studio

Leading tools for cross-platform hybrid development that maximize code reuse, speed up development, and promote team work

Operational Analytics

Run Time



Operational Console

UI for app deployment, management, and version enforcement, real-time operational analytics, push notifications



Worklight Server

Gateway for mobile user engagement, security, analytics, and application control



App Runtime

Client APIs available for native, hybrid, and web apps



Worklight App Center

A non-MDM, cross-platform, private mobile app store tailored to the needs of development team or as an enterprise store



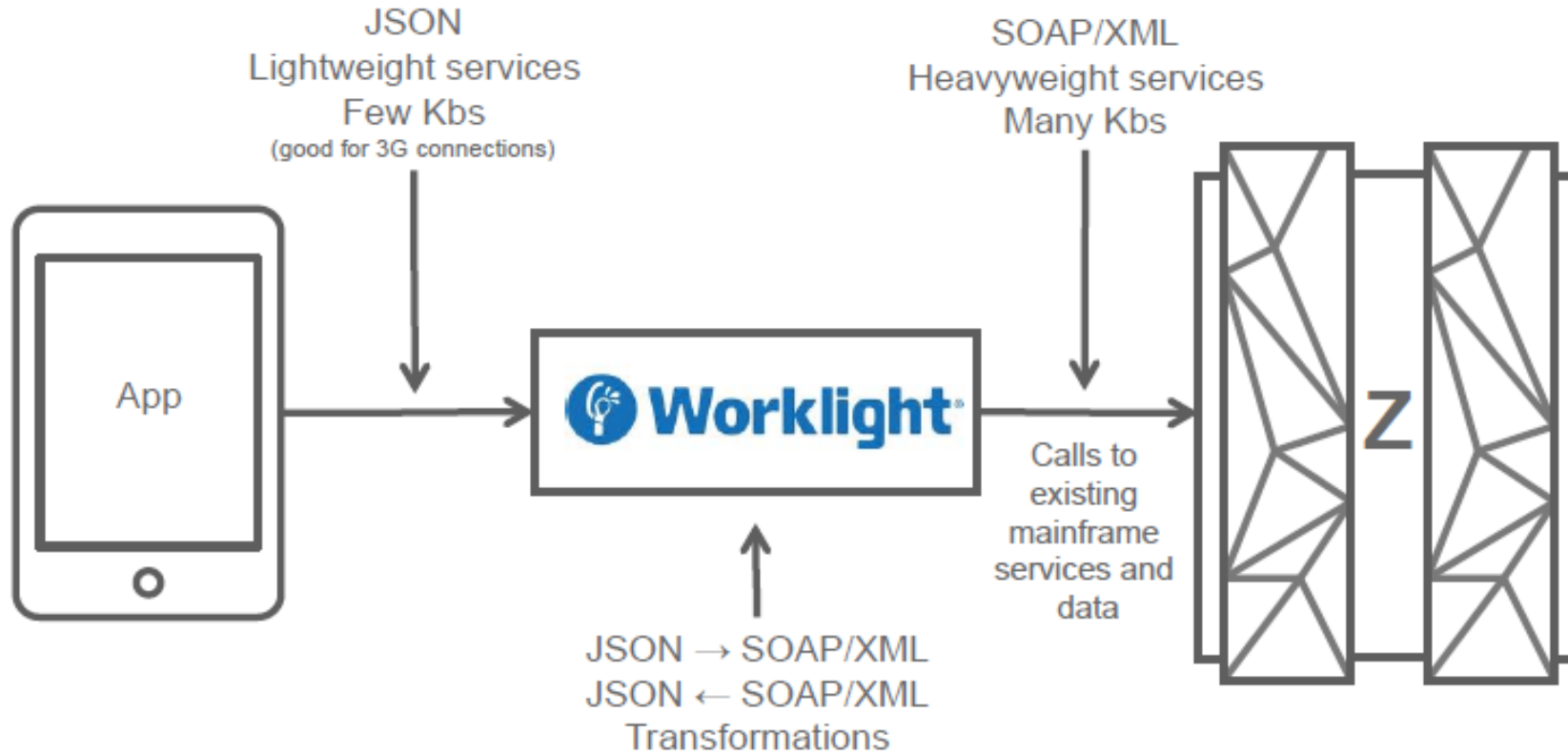
- Co-location reduces latency
- Availability and scalability
- Hardware encryption
- Traditional advantages of consolidating multiple distributed servers onto z/Linux
 - Reduce data center footprint
 - WAS software license savings
 - Simpler management
 - Energy savings.

We recommend running Worklight Server in System z Linux for data-rich applications that will heavily leverage data and transactions from z/OS.

[See this wiki for more rationale for WL on z.](#)



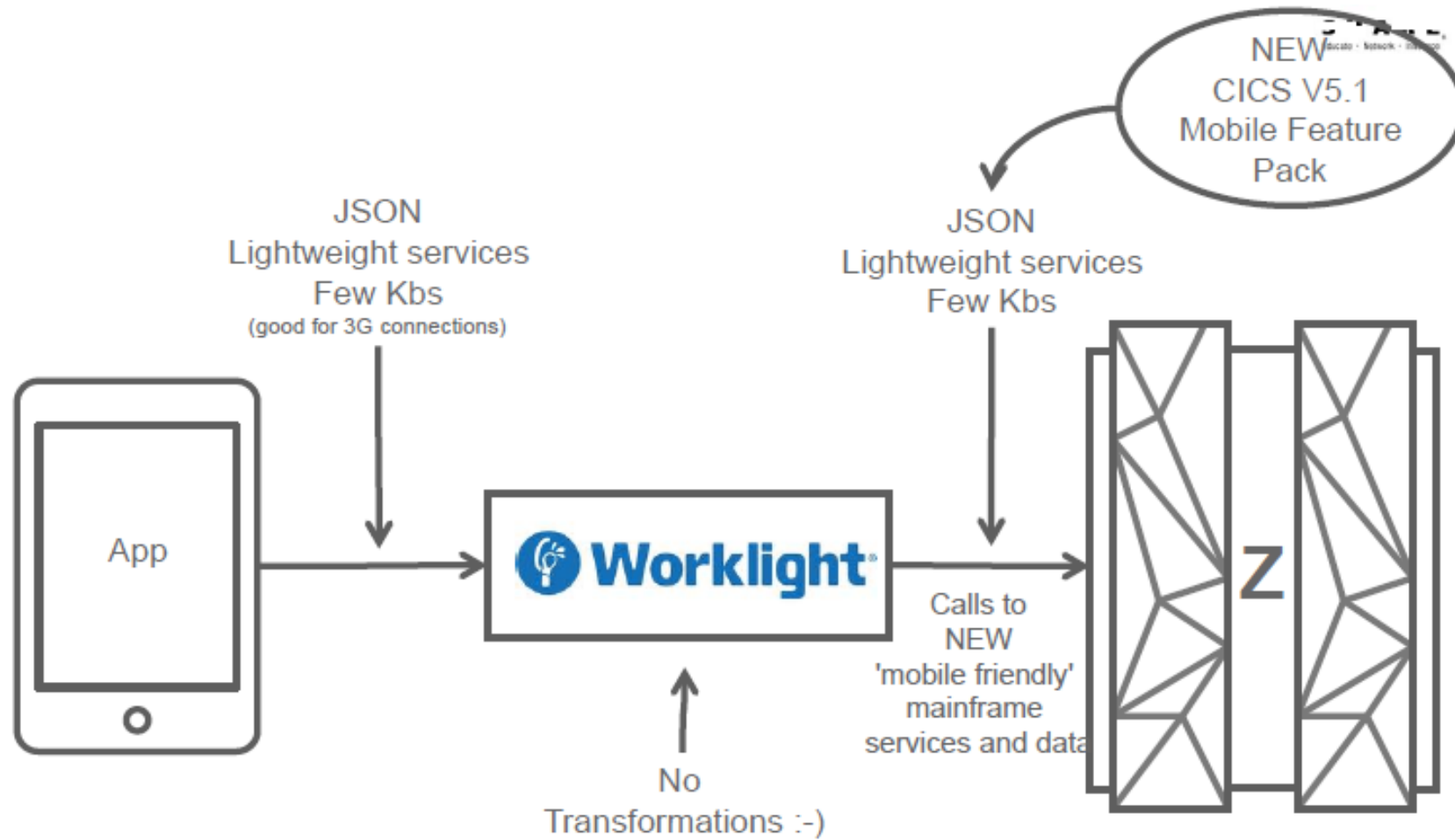
Web Services are so yesterday



Parsing XML Takes time and CPU



JSON end to end



Why do robbers rob banks ?

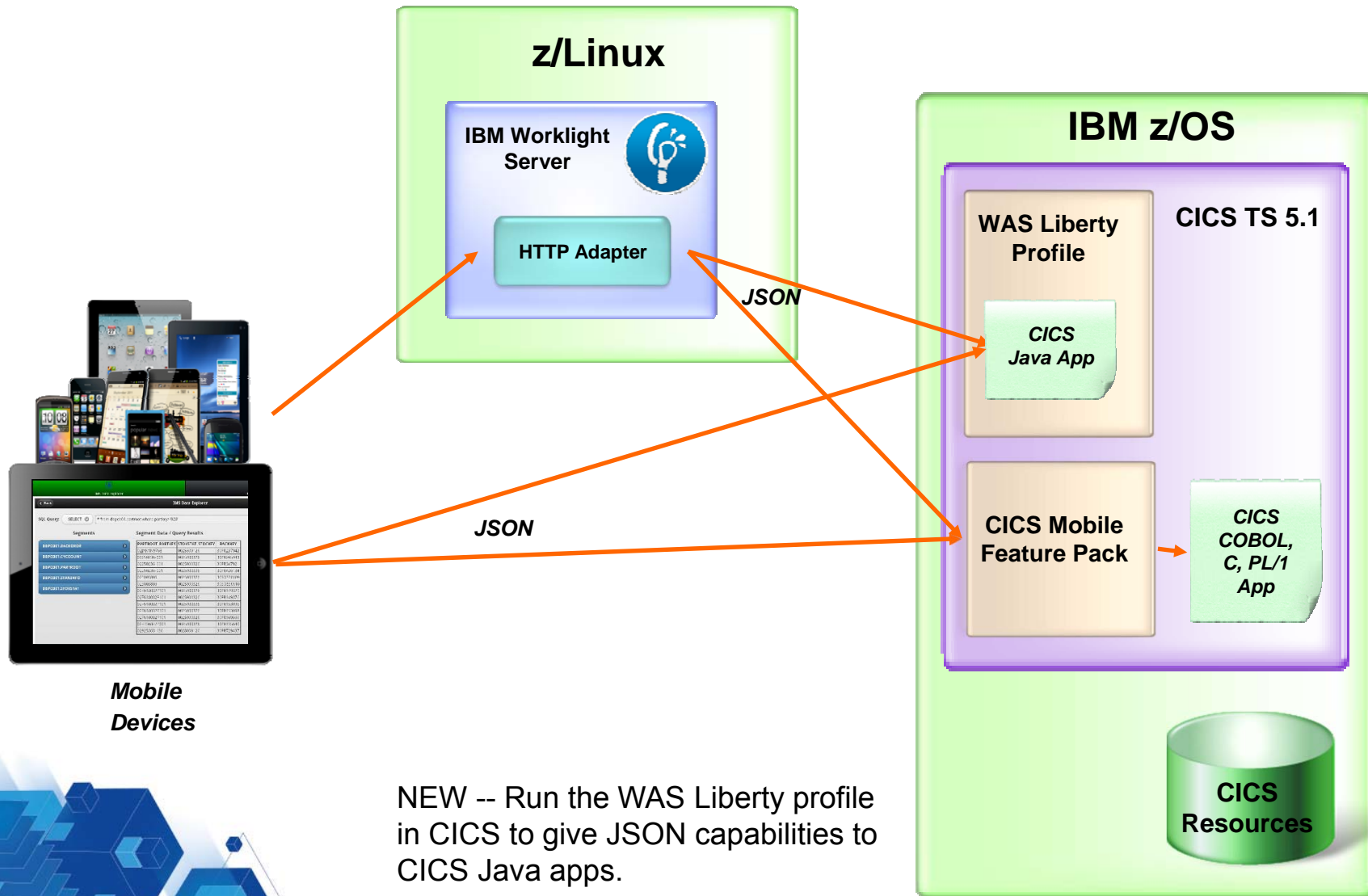


- Because that is where the money is !

- Why do JSON calls to z/OS?
 - Because that is where your existing core applications are !

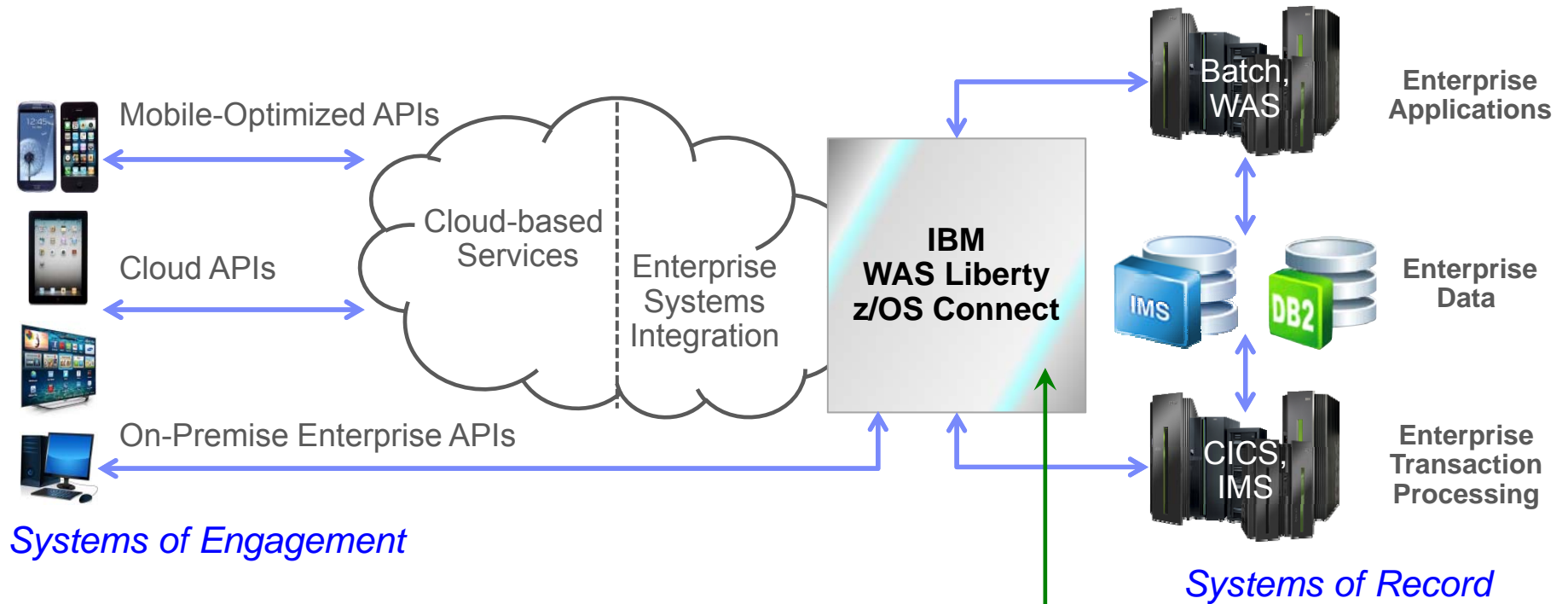


CICS Mobile Enablement (CICS TS 5.1)



NEW -- Run the WAS Liberty profile in CICS to give JSON capabilities to CICS Java apps.





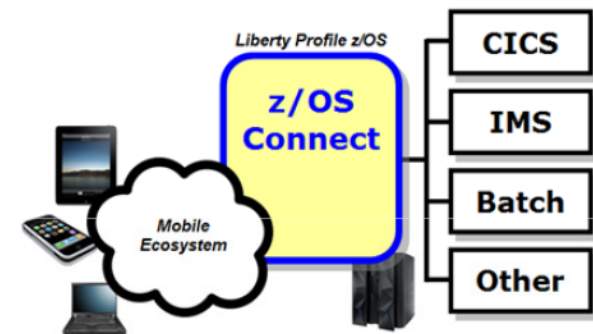
No programming required !



Why z/OS Connect ?



- JSON support means no transformation
- Common and consistent entry point to z/OS applications
 - Handles transformation from JSON to required format
 - Common authorization point
- It's Java
 - Offload to zIIP CPUs
- No programming required for integration
- Ships as feature of WebSphere Application Server for z/OS
 - Also z/OS Connect available in IMS
 - Statement of direction for z/OS Connect in CICS
- More info at:
 - <https://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/WP102439>



http://1.2.3.4:9080/egui-cat

server.xml

```
<zosConnectService id="EGUI-Cat"
  invokeURI="/egui-cat"
  serviceName="egui-cat-backend"
  dataXformRef="xformJSON2Byte"
  serviceRef="wolaCICS" />
```

Liberty STC



CICS STC



Trans

Batch job:
generates JSON mappings and bind files

```
//JAVAPROG EXEC BBGLS2JS
//INPUT.SYSUT1 DD *
PDSLIB=EDMCAR.Z.COBOL
REQMEM=EGUIQCAT
RESPMEM=EGUIQCAT
JSON-SCHEMA-
REQUEST=/u/json/egui_cat_request.json
```



- You're mission should you chose to accept it...
 - Develop and live demo a mobile application using JSON to access a 3270 green screen application



z/OS Connect - Get list of Rest services



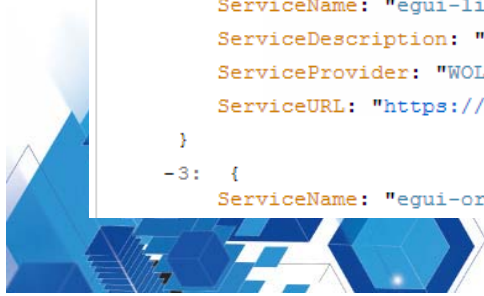
Advanced Rest Client interface showing a REST client configuration and the response to a GET request.

URL: `http://wsc1.washington.ibm.com:29065/zosConnect/services`

Method: GET

Response (JSON):

```
{
  -zosConnectServices: [5]
  -0: {
    ServiceName: "egui-cat-backend"
    ServiceDescription: "DATA_UNAVAILABLE"
    ServiceProvider: "WOLA-1.0"
    ServiceURL: "https://wsc1.washington.ibm.com:29465/zosConnect/services/egui-cat-backend"
  }
  -1: {
    ServiceName: "egui-listItem"
    ServiceDescription: "DATA_UNAVAILABLE"
    ServiceProvider: "WOLA-1.0"
    ServiceURL: "https://wsc1.washington.ibm.com:29465/zosConnect/services/egui-listItem"
  }
  -2: {
    ServiceName: "egui-listCatalog"
    ServiceDescription: "DATA_UNAVAILABLE"
    ServiceProvider: "WOLA-1.0"
    ServiceURL: "https://wsc1.washington.ibm.com:29465/zosConnect/services/egui-listCatalog"
  }
  -3: {
    ServiceName: "egui-orderItem"
  }
}
```



Get JSON request schema



▶ <http://wsc1.washington.ibm.com:29065/zosConnect/services/egui-listCatalog?action=getRequestSchema>

GET POST PUT PATCH DELETE HEAD OPTIONS Other

Raw

JSON

Response

[Copy to clipboard](#) [Save as file](#)

```
{
  -properties: {
    -DFHOXCMNOperation: {
      -properties: {
        -ca_inquire_request: {
          -properties: {
            -ca_item_count: {
              maximum: 999
              type: "integer"
              minimum: 0
            }
            -ca_list_start_ref: {
              maximum: 9999
              type: "integer"
              minimum: 0
            }
            -ca_cat_item: {
              -items: {
                -properties: {
                  -ca_department: {
                    maximum: 999
                    type: "integer"
                    minimum: 0
                  }
                  -ca_item_ref: {
                    maximum: 9999
                    type: "integer"

```



Send JSON request to get items in catalog

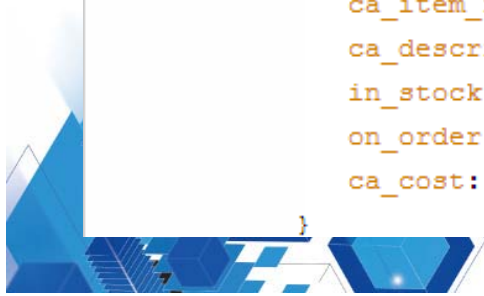


▶

GET POST PUT PATCH DELETE HEAD OPTIONS Other

[Copy to clipboard](#) [Save as file](#)

```
{
  -DFHOXCMNOperationResponse: {
    -ca_inquire_request: {
      ca_item_count: 15
      ca_list_start_ref: 10
    }
    -ca_cat_item: [15]
    -0: {
      ca_department: 10
      ca_item_ref: 10
      ca_description: "Ball Pens Black 24pk"
      in_stock: 100
      on_order: 0
      ca_cost: "002.90"
    }
    -1: {
      ca_department: 10
      ca_item_ref: 20
      ca_description: "Ball Pens Blue 24pk"
      in_stock: 0
      on_order: 50
      ca_cost: "002.90"
    }
  }
}
```



Testing Mobile App from Worklight



9.192.237.98:10080/worklightconsole/index.html#MobileEnterprise,catalog

IBM Worklight Console

Home > MobileEnterprise

Catalog Devices Push Notifications Log Profile

Deploy application or adapter: No file selected.

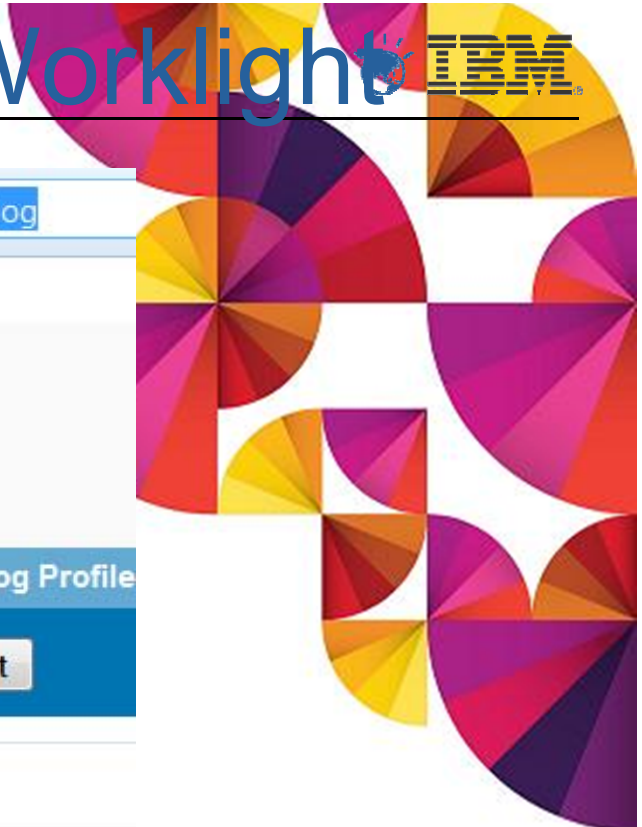
EGUI *EGUI*



Last deployed at: 9/3/2014 4:42 PM

iPhone Version 2.0 ● Active
 Lock this version

iPad Version 2.0 ● Active





Mobile Browser Simulator

The Mobile Browser Simulator displays mobile web pages in a variety of mobile browser sizes and shapes.

Webpage:

Go / Refresh

Add D

Cordova

- ▶ Device
- ▶ Events
- ▶ Accelerometer
- ▶ Battery
- ▶ Camera
- ▶ Capture
- ▶ Compass
- ▶ Contacts
- ▶ File
- ▶ Geolocation

Skin ▼



Rotate

CICS Catalog Manager



Browse Catalog



Inquire (Search) Catalog



Shopping Cart



Listing items in the store



Mobile Browser Simulator

The Mobile Browser Simulator displays mobile web pages in a variety of mobile browser sizes and shapes.

Webpage:

Go / Refresh

Add

Cordova

- ▶ Device
- ▶ Events
- ▶ Accelerometer
- ▶ Battery
- ▶ Camera
- ▶ Capture
- ▶ Compass
- ▶ Contacts
- ▶ File
- ▶ Geolocation
- ▶ Network
- ▶ Scenario

Skin



Rotate

Back

Browse Catalog

Ball Pens Black 24pk

100 in stock

Ball Pens Blue 24pk

Out of stock

Ball Pens Red 24pk

85 in stock

Ball Pens Green 24pk

70 in stock

Details about an item



Mobile Browser Simulator

The Mobile Browser Simulator displays mobile web pages in a variety of mobile browser sizes and shapes.

Webpage: [Go / Refresh](#) | [Add Device](#)

Cordova

- ▶ Device
- ▶ Events
- ▶ Accelerometer
- ▶ Battery
- ▶ Camera
- ▶ Capture
- ▶ Compass
- ▶ Contacts
- ▶ File
- ▶ Geolocation
- ▶ Network
- ▶ Scenario

Skin | | | Rotate |

[Back](#) **Item Details**

Description:	Ball Pens Red 24pl
Item Ref #:	30
Department:	10
Unit Cost:	\$2.90
Stock Qty:	85



Ordered item in the shopping cart





Mobile Browser Simulator

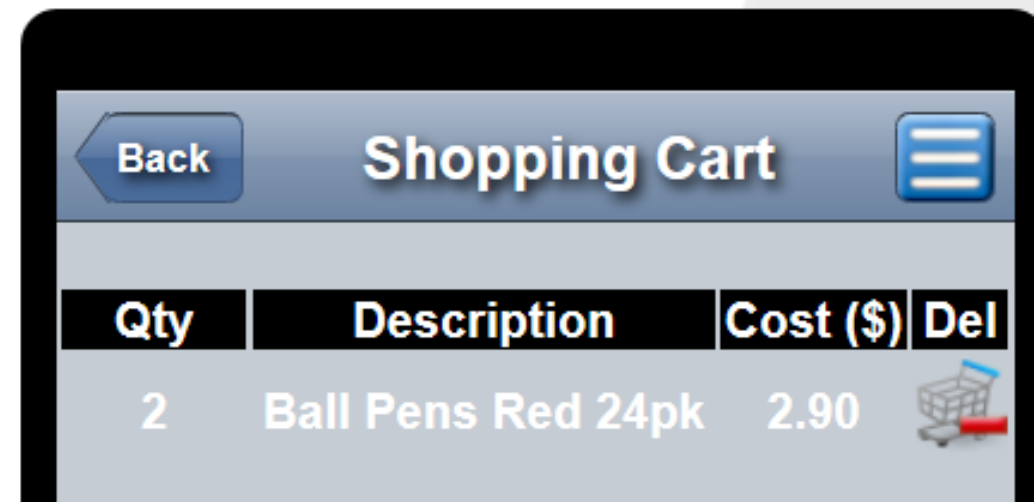
The Mobile Browser Simulator displays mobile web pages in a variety of mobile browser sizes and shapes.


Webpage: [Go / Refresh](#) | Add

Cordova

- ▶ Device
- ▶ Events
- ▶ Accelerometer
- ▶ Battery
- ▶ Camera
- ▶ Capture
- ▶ Compass
- ▶ Contacts

Skin |  |  |  Rotate | 



Qty	Description	Cost (\$)	Del
2	Ball Pens Red 24pk	2.90	



After all that...



- Anything unsure of ?



- System z is an open and modern platform
 - Many ways to make existing System z applications available
- New paradigm of Mobile fits well with System z
- IBM mobile pricing keeping System z affordable





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